TECHNICAL MANUAL

OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL AIR CONDITIONER, VERTICAL COMPACT, 9,000 BTU 115 VOLT, SINGLE PHASE, 50/60 HERTZ WEDJ MODEL VM 9000-115

NSN 4120-00-935-1609

HEADQUARTERS, DEPARTMENT OF THE ARMY

WARNING

Disconnect the air conditioner from the power source before performing any maintenance on the components of the unit.

CHANGE NO. 1

HEADQUARTE
DEPARTMENT OF THE A
WASHINGTON, D.C., 1 Apri

OPERATOR, ORGANIZATIONAL,
DIRECT SUPPORT AND GENERAL SUPPORT
MAINTENANCE MANUAL

AIR CONDITIONER, VERTICAL COMPACT,
9,000 BTU, 115 VOLT, SINGLE PHASE, 50/60 HERTZ
(WEDJ MODEL VM, 9000-115)
NSN 4120-00-935-1609

TM 5-4120-345-14, 30 July 1979, is changed as follows:

1. Remove and insert pages as indicated below. New or changed text is indicated by a vertical bar in the margin. An illustration change is by a miniature pointing hand.

Remove pages	Insert pages
i and ii	i and ii
3-1 and 3-2	3-1 and 3-2
4-5 and 4-6	4-5 and 4-6

2. Retain this sheet in front of manual for reference purposes.

By Order of the Secretary of the Army:

JOHN A. WICKHAM, J
General, United States A
Chief of Staff

Official:

R. L. DILWORTH
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:
To be distributed in accordance with DA Form 12-25A, Operator Maintenan
quirements for Air Conditioner, Vertical Compact, 9000 BTU, 115V, 50/60HZ
(VM 900-115).

AIR CONDITIONER, VERTICAL COMPACT, 9,000 BTU, 115 VOLT, SINGLE PHASE, 50/60 HERTZ (WEDJ MODEL VM, 9000-115) NSN 4120-00-935-1609

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistake or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, U.S. Army Troop Support Command, ATTN: AMSTR-MCTS, 4300 Goodfellow Boulevard, St. Louis, MO 63120-1798. A reply will be furnished directly to you.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

a. This manual is for use in operating and maintaining the Air Conditioner, Vertical Compact, 9,000 BTU, 115 Volt, Single Phase, 50/60 HERTZ, WEDJ Model VM 9000-115. It covers installation and operation, organizational, direct and general support maintenance of the equipment.

b. Appendix A contains a list of publications applicable to this manual.

c. Numbers in parenthesis following nomenclature callouts on illustrations indicate quantity. Numbers preceding nomenclature callouts indicated preferred maintenance sequence.

d. Equipment maintenance forms and procedures for their use are contained in TM 38-750, The Army Maintenance Management System (TAMMS).

e. EIR's will be prepared on SF 368 (Quality Deficiency Report). Instructions for preparing EIR's are provided in TM 38-750, The Army Maintenance Management System. EIR's should be mailed directly to Commander, U. S. Army Troop Support and Aviation Materiel Readiness Command, ATTN: DRSTS-MTPS, 4300 Goodfellow Blvd., St. Louis, MO 63120.

1-2. Record and Report Forms.

a. DA Form 2258 (Depreservation Guide of Engineer Equipment).

b. Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

1-3. Equipment Serviceability Criteria

For equipment serviceability criteria refer to technical manual TM 5-4120-345-ESC.

1-4. Destruction of Materiel to Prevent Enemy Use

Demolition and destruction of equipment will be under the direction of the commander and in accordance with TM 750-244-3.

1-5. Administrative Storage

For procedures, forms, and records, and inspections required during administrative storage of this equipment, refer to TM 740-90-1.

Section II. DESCRIPTION AND TABULATED DATA

1-6. Description

a. General. The air conditioner (fig. 1-1) is used primarily in van type enclosures for providing filtered, conditioned, or heated air as required to maintain service conditions necessary for the efficient operation of electronic equipment and for the comfort of operating personnel housed within the specified vans. It is a completely self-contained, air cooled, electric motor driven unit designed for continuous operation with varying loads. It is equipped with internal ducting to the low side of the evaporator fan so that ventilation air and air from the chemical and biological filter unit may be supplied by the evaporator fan.

b. **Condensing Section.** The condensing section, located at the bottom of the unit, contains the hermetically sealed compressor, condensing coil, condenser air intake opening, condenser air discharge opening, control panel, junction box, thermostatic switch, power receptacle connector, condenser fan, fan motor, filter drier, suction and discharge access fittings, solenoid valve, capacitors, and high pressure relief valve.

c. **Evaporator Section.** The evaporator section, located in the top of the unit, contains an evaporator coil, evaporator fan, air conditioning filter, intake and discharge grilles, evaporator coil drain pan, expansion valves, electrical heaters, sight glass, fan speed relay, hi and lo pressure switches, solenoid valve, expansion valve, liquid line quench valves, hot gas bypass regulator valve, and a damper to regulate the amount of outdoor air entering the air conditioner.

1-7. Identification and Tabulated Data

a. **Identification.** The air conditioning units have three major nameplates. The information on these plates is listed below.

(1) **Manufacturer's identification plate.**

Located on top of unit.

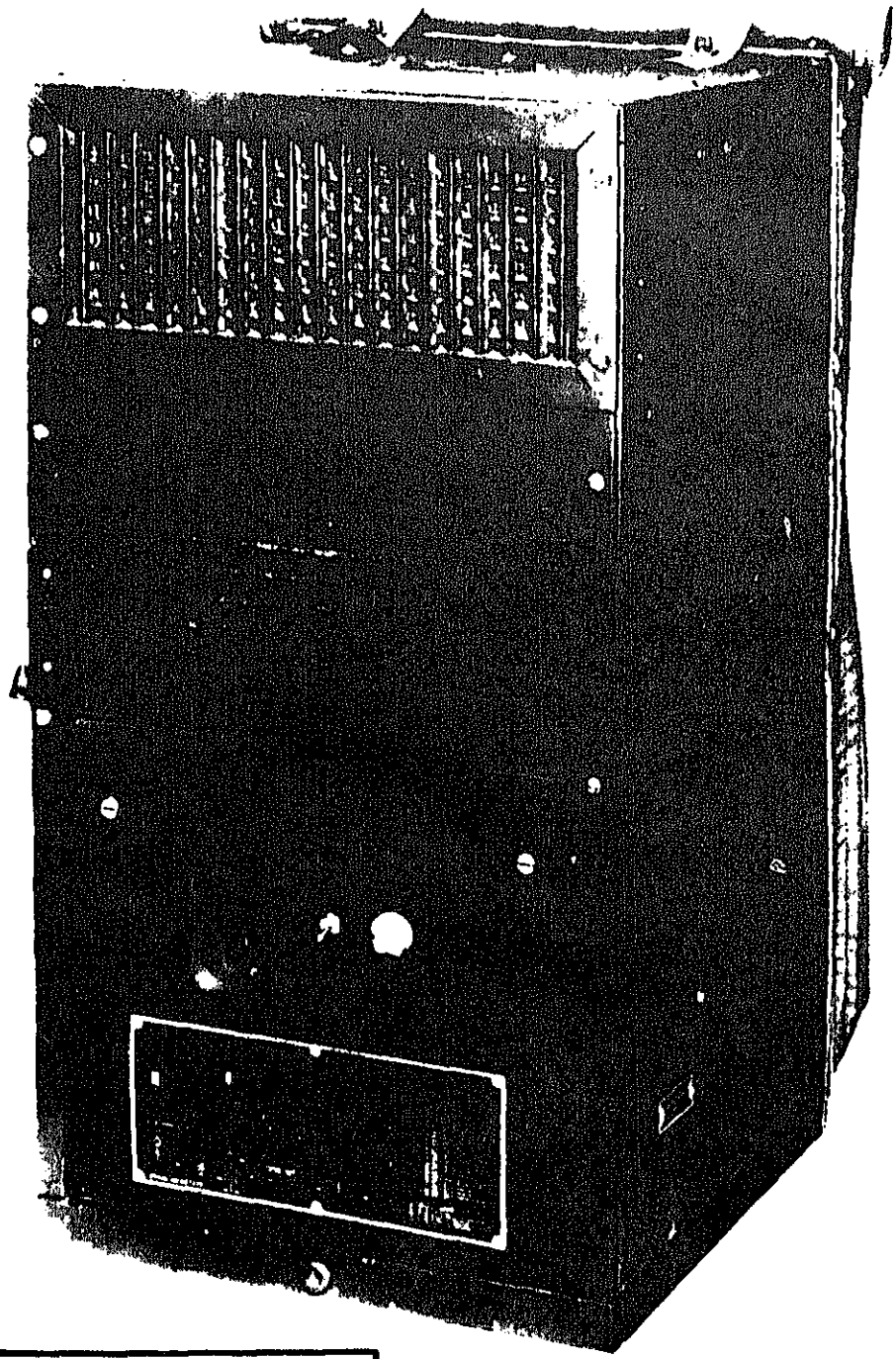
Title . . . . . .Air Conditioner, Vertical, Compact, 9000 BTU/HR, 115 volts, single phase, 50/60 Hz
Part No. 97403-13218E9905
NSN 4120-00-935-1609
Manufacturer . . . . . .WEDJ INC.
Contract Nos. DAAKOI-76-C-5216, DAAKOI-76-C-5694
Serial No. . . . . .77-002 thru 77-084, 78-1164 thru 78-1350
Weight. . . . . .187 lbs.
Refrigerant. 22
Refrigerant charge . . . .53 oz.

(2) Motor identification plate.

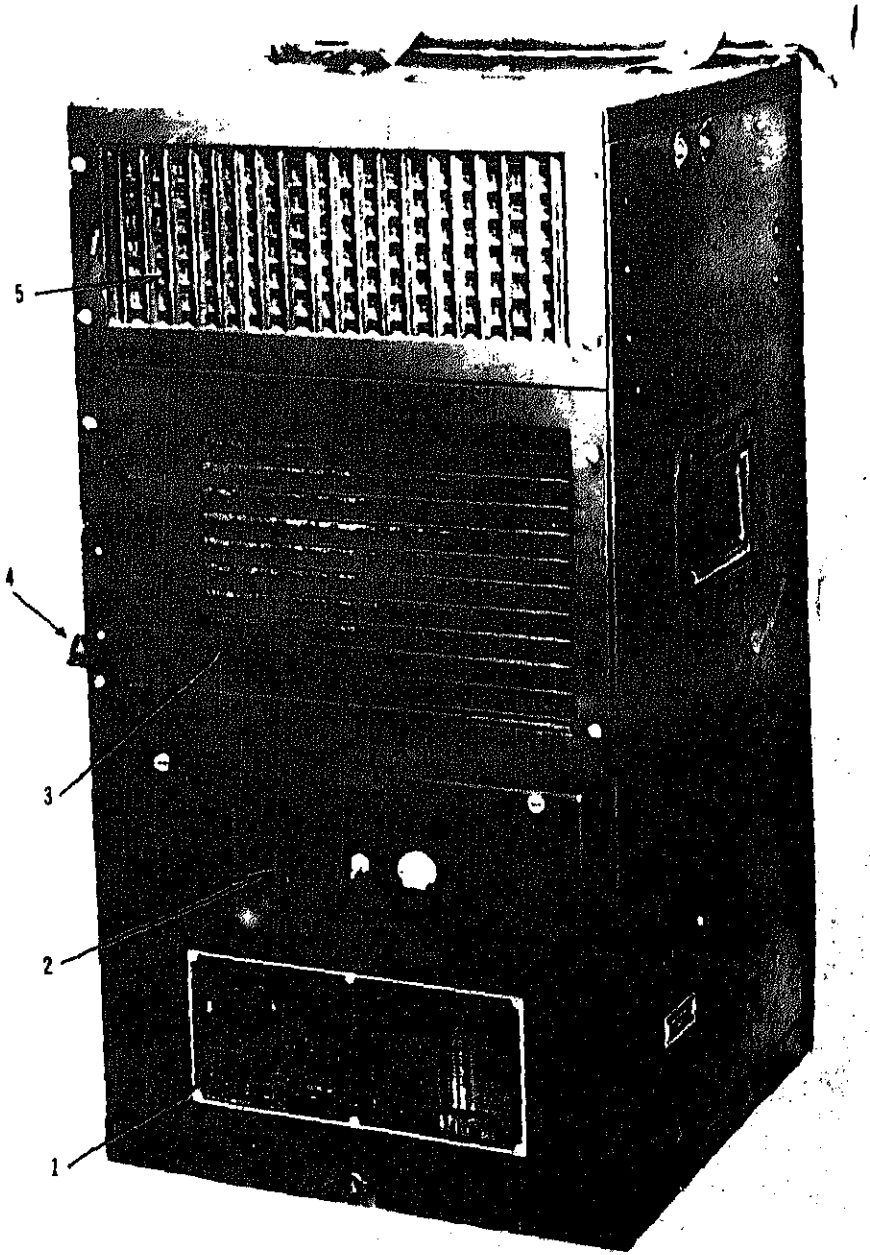
Model 4730-18
Manufacturer . . . . . .Welco Industries
Cincinnati, Ohio
H.P. . . . . ..86, .10
RPM 3450, 1770
Frame 4730-18
Volts. 115
Phase 1
Cycles. 50/60
FLA 8.0, 1.4
LRA. 24.0, 4.0
Rating. . . . . .Cont.
Thermal protection

(3) Compressor identification plate.

Manufacturer . . . . . .Welco Industries
Cincinnati, Ohio
Model MIL-R-9-VAC-610
Oil charge . . . . . .24 oz.
Oil type. . . . . .Capella D
Refrigerant. 22
FLA . . . . . .
LRA. . . . . .
Ultimate trip . . . . . .21.5 Amps.
Circuit breaker . . . . . .Heinemann #JA2-Z71-2
W/crankcase heater

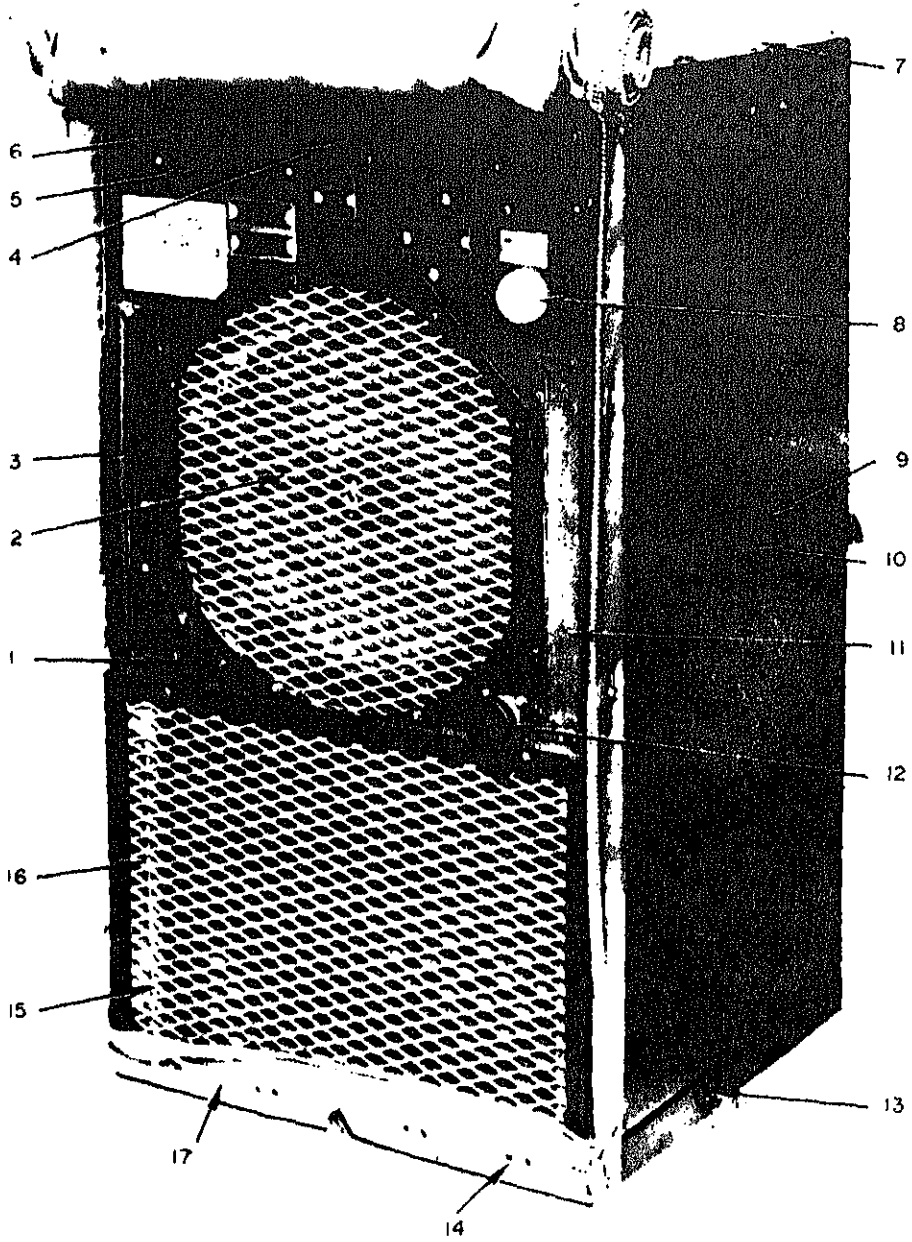


SHIPPING DIMENSIONS			
LENGTH	–	22 IN	(55.9cm)
WIDTH	–	22 IN	(55.9 cm)
HEIGHT	–	38 IN	(96.5 cm)



1. FRONT ACCESS PANAL
2. CONTROL BOX
3. INTAKE GRILLE
4. DAMPER DOOR COMTROL CHAIN
5. DISCHARGE GRILLE

T55-4120-345-14/1-2



1. OUTSIDE AIR THERMOSTAT
2. FAN GUARD
3. CB COVER
4. ADDITIONAL FASTENING DEVICE
5. LOW PRESSURE CUT-OUT SWITCH
6. HIGH PRESSURE CUT-OUT SWITCH
7. COVER PANEL
8. SIGHT GLASS
9. HANDLE
10. CASING
11. FRESH AIR INLET SCREEN
12. POWER RECEPTACLE CONNECTOR
13. DRAIN PLUG (4)
14. COVER FASTENING HARDWARE
15. CONDENSER COIL
16. CONDENSER SCREEN
17. CANVAS CONDENSER COVER

TS5-4120-345-14/1-3

b. The operator must know how to perform every operation of which the air conditioner is capable. This section gives instructions on starting, stopping, and operating details of the air conditioner. Since nearly every application presents a different problem, the operator may have to vary given procedures to fit the individual job.

2-2. Starting

a. **Preparation for Starting.**

(1) Perform necessary daily preventive maintenance services, (Table 3-1).
(2) Check switch functions (para 2-4).

b. **Starting.**

(1) **Cooling operation.**

(a) Position thermostat for desired temperature.
(b) Place fan speed toggle switch in desired position.
(c) Place selector switch on COOL position.
(d) For cooling with 100 percent recirculated air, close damper door.
(e) For cooling with fresh makeup air, open damper door and partially close intake grille damper.
(f) For cooling with fresh makeup air drawn through chemical biological filter unit when outdoor air is contaminated, close damper door and partially close intake grille damper.

(2) **Heating operation.**

(a) Position thermostat for desired temperature.
(b) Place fan speed toggle switch in desired position.
(c) Place selector switch on LO-HEAT or HI-HEAT position.
(d) For heating with 100 percent recirculated air, close damper door and open intake grille damper.
(e) For heating with fresh makeup air, open damper door and partially close intake grille damper.
(f) For heating with fresh makeup air drawn through chemical biological filter unit when outdoor air is contaminated, close damper door and partially close intake grille damper.

(3) **Ventilating operation.**

(a) Place selector switch in VENT position.
(b) Place fan speed toggle switch in desired position.
(c) For ventilating operation, open damper door and close grille damper.

NOTE: If the air conditioner fails to start, open front access panel, and push reset control on circuit breaker (Fig. 4-9).

2.3 Stopping

Refer to Figure 2-1. Place the selector switch in OFF position.

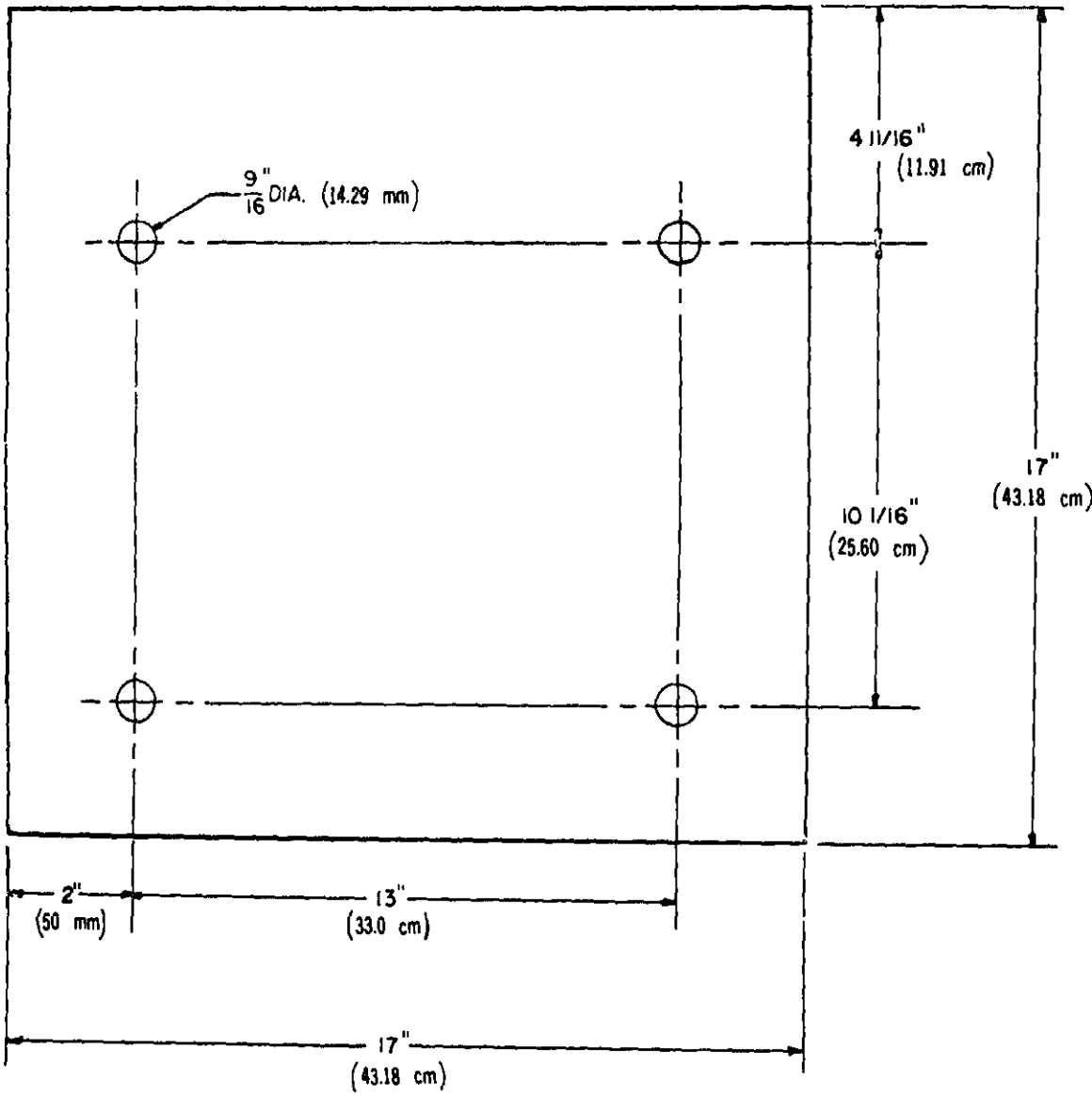


Figure 2-1. Base Plan.

2-4. Controls and Instruments

a. **Selector Switch.** Sets the unit for cooling or heating.

b. ***Thermostat.*** *The thermostat is set for the desired temperature.*

c. **HI-LO Fan Speed Switch.** Set the fan for high or low speed.

d. **Liquid Line Sight Glass.** Indicates the condition of the refrigerant.

e. **High Pressure Cutout Control.** The high pressure cutout control located at the upper left rear c *(Fig. 1-3) is designed to sense line pressure from the compressor and will* cutout at 445 psig (pounds per s gauge). When the line pressure has reduced to 400 psig, the high pressure cutout control can be reset by p reset button.

f. **Low Pressure Cutout Control.** The low pressure cutout control located at the upper left rear c (Fig. 1-3) is designed to sense line pressure from the compressor and will cutout at 25 psig. When the line p increased to 50 psig, the low pressure cutout control can be reset by pushing the reset button.

2-5. Operation Under Usual Conditions

a. Refer to paragraph 2-2, and start the air conditioner.

b. Refer to paragraph 2-2b. and operate the air conditioner.

Section II. OPERATION UNDER UNUSUAL CONDITIONS

2-6. Operation in Extreme Cold.

a. **General.** The air conditioner is designed to operate at a maximum low temperature of 50 degrees that all thermostatic controls and dampers are in working order.

b. ***Electrical System.*** *Make sure the electrical system is free of ice and moisture.*

CAUTION

Do not disturb the wiring during cold weather unless absolutely necessary. Cold temperatures make wiring and insulation brittle and are easily broken.

2-7. Operation in Extreme Heat

a. **General.** *The air conditioner is designed to operate satisfactorily at temperatures up to 120 degrees F.*

b. **Ventilation.** Allow sufficient room around the air conditioner for adequate air circulation.

NOTE: Do not restrict the flow of air at the intake and discharge openings of the unit.

2-8. Operation in Dusty or Sandy Areas

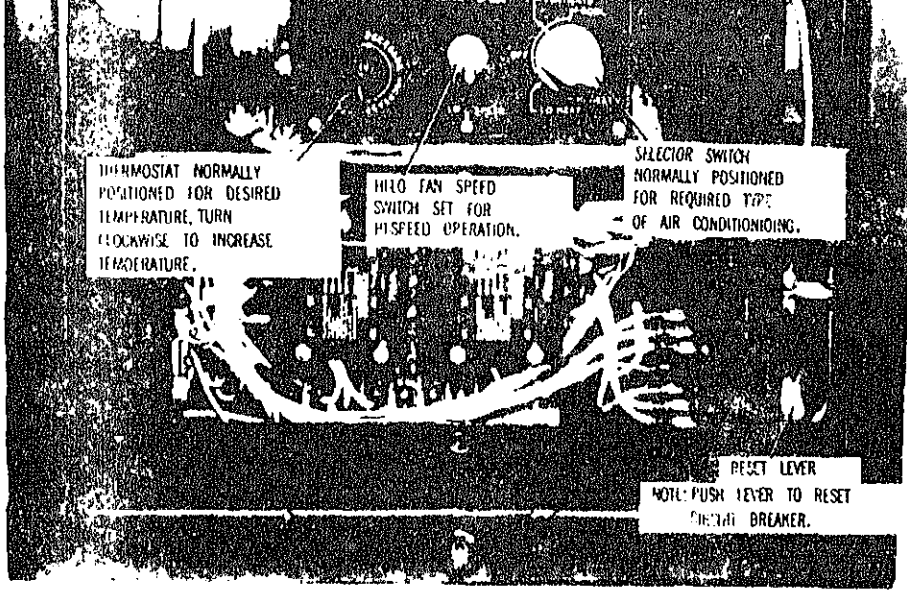
Clean the condenser coil (para 6-4) and evaporator coil (para 6-3). weekly or more often if necessary air conditioning filter, fresh air inlet filter, and condenser screen daily (para 4-17).

9. Operation in Salt Water Areas

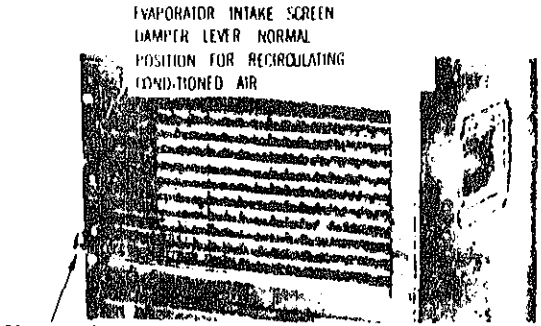
Wash the exterior of the unit with clean, fresh water at frequent intervals. Do not damage the electrical equipment during the cleaning operation. Coat exposed metal surfaces with rust proofing material. Remove corrosion and paint the exposed metal surfaces.

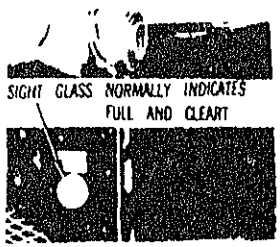
10. Operation at High Altitudes

The air conditioner is designed to operate without special attention at altitudes up to 5,000 feet.



A. CONTROLS





B. SIGHT GLASS

TM5-4120-345-14/2-2

Figure 2-2. Controls and Instruments.

CHAPTER 3. OPERATOR MAINTENANCE INSTRUCTIONS

Section I. LUBRICATION

All bearings are permanently lubricated. No lubrication instructions are required.

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (DAILY)

3-1. *General*

To insure that the air conditioner is ready for operation at all times, it must be inspected systematically so defects may be discovered and corrected before they result in serious damage or failure. The necessary preven maintenance services to be performed are listed and described in Table 3-1. The sequence numbers indicate the r mum inspection requirements. Defects discovered during operation of the unit will be noted for further correctio be made as soon as operation has ceased. Stop operation immediately if a deficiency is noted during operation w would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded toge with corrective action taken on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) at the ear possible opportunity.

3-2. *Daily Preventive Maintenance*

Table 3-1 contains a tabular listing of preventive maintenance services which must be performed by the op tor. The sequence numbers are listed consecutively and indicate the sequence of minimum requirements. Refe Figure 3-1. The numbers on the figure are also the sequence number in Table 3-1.

Table 3-1. *Operator/Crew Preventive Maintenance Checks and Services*

NOTE

Within designated interval, these checks are to be performed in the order listed

D-During

Item No.	Interval D	Item To Be Inspected	Procedures Check for and have repaired or adjusted as necessary	Equipment Is Not Ready/ Available If:
1	•	Air conditioner Unit	During starting and operation, check for unusual noise or rough running. Check for excessive vibration, lack of power, or any indication of a failing or defective component. If suspected, notify organizational maintenance.	

3.3.

a. This section contains troubleshooting information for locating and correcting most of the operating tr which may develop in the air conditioner. Each malfunction for an individual component, unit or system is follov a list of tests or inspections which will help you to determine corrective actions to take. You should perform th inspections and corrective actions in the order listed.

b. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective a If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

c. The table lists the common malfunctions which you may find during the operation or maintenance or conditioner or its components.

3-4. Troubleshooting.

Troubleshooting of the air conditioner is given in table 3-2.

NOTE: Before you use this table, be sure you have performed all applicable operating checks.

Table 3-2. Troubleshooting

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
1. COMPRESSOR FAILS TO START Step 1. Set selector switch to COOL position (Fig 4-2A). If compressor does not start, go to step 2. Step 2. Reset circuit breaker (Fig. 2-1). If compressor does not start, go to step 3. Step 3. Check if high pressure cutout switch is closed. Push reset button to reset cutout switch if open (Fig. 1-3). Step 4. Check if low pressure cutout switch is closed. Push reset button to reset cutout switch if open (Fig. 1-3).

Section IV. MAINTENANCE PROCEDURES

3-5. General

Instructions in this section are published for the information of the operator to maintain the air condi

3-6. Air Filter Inspection and Service

a. Inspection.

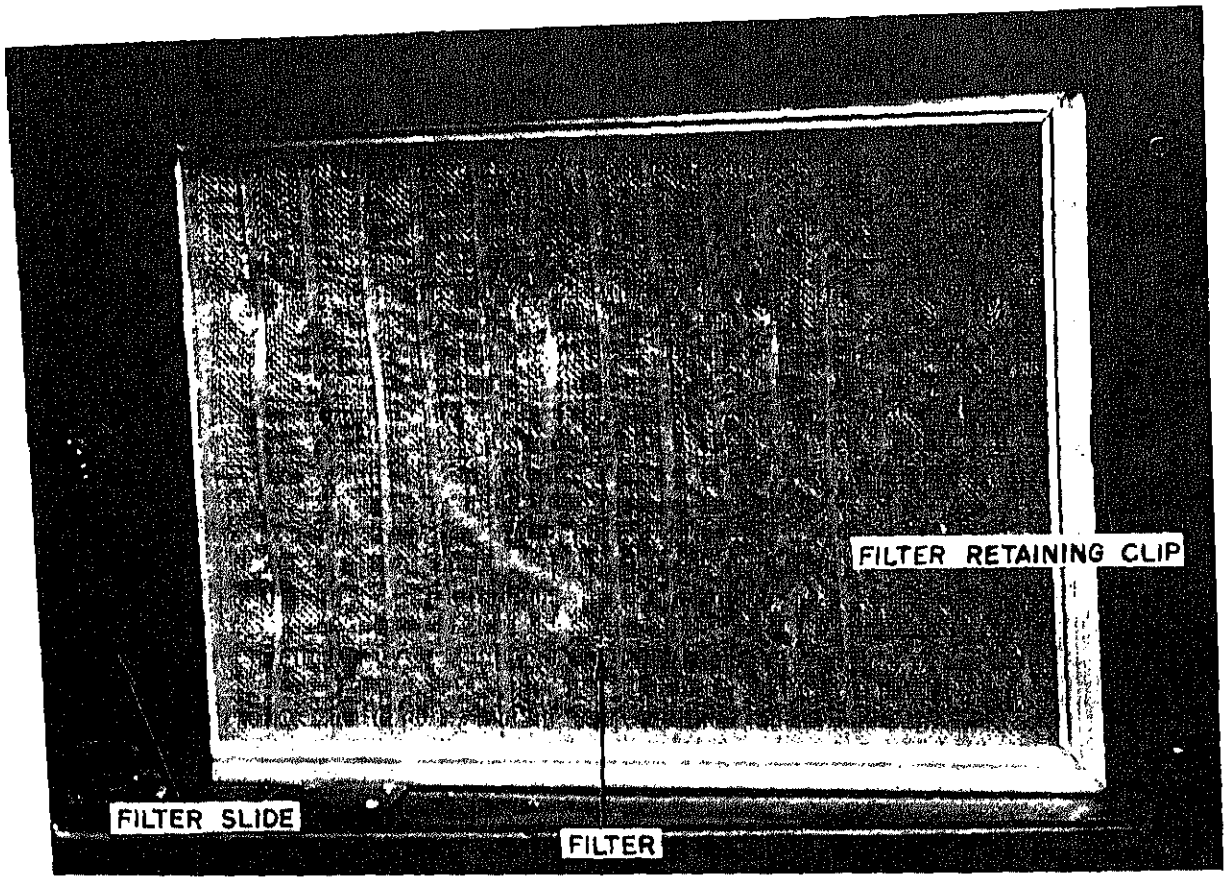
(1) Remove intake grille, Fig. 1-2.
(2) Remove air filter, Fig. 3-1.
(3) Inspect filter for dirt.

b. Service.

(1) Wash filter in hot water or approved solution.
(2) Dry with compressed air.
(3) Spray with light coat of oil.

3-7. Panels, Grilles, and Screens Inspection

Refer to Figures 4-4 and 4-5 and inspect panels, grilles, and screens.



STEP 1 - PUSH FILTER RETAINING CLIP TO RIGHT.
STEP 2 - SLIDE FILTER FROM UNIT.
TS5-4120-345/3-1

Figure 3-1. Air Filter, removal and installation.

CHAPTER 4. ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

4-1. Unloading the Equipment

a. Remove any blocking or tiedowns that may have been used to secure the item to the carrier. The air conditioner is shipped in a wooden carton, the base of which is raised to provide for insertion of tongs of a forklift.

b. Use a forklift or other suitable lifting device to remove unit from carrier. If necessary, the unit may be unloaded manually.

CAUTION: Use care in handling to avoid damaging the air conditioner.

4-2. Unpacking the Equipment.

a. **General.** Move air conditioner to installation site before removing shipping container. Cut the metal bands and remove top, end, and sides of carton, and the Kimpak covering. Remove bolts securing base of unit to carton, and using the handles, lift unit from carton.

b. **Depreservation.** Prior to placing unit in operation, accomplish depreservation in accordance with instructions outlined in DA Form 2258 (Depreservation Guide of Engineer Equipment). DA Form 2258 is attached or near the operational controls.

4-3. Inspecting and Servicing Equipment

a. Perform quarterly preventive maintenance services (Fig. 4-3).

b. Inspect entire air conditioner for signs of damage, paying particular attention to evaporator and condenser coils.

c. The air conditioner contains a full operating charge of refrigerant and compressor oil. No further service is required.

4-4. Installation of Separately Packed Components

a. **General.** The air conditioner is basically a self-contained unit. However, in certain installations it may become desirable to utilize the sound attenuator and/or blockoff plate with an electrical receptacle, and use a remote control box.

b. **Sound Attenuator.** The sound attenuator will provide a sound dampening effect and is mounted on the front of the air conditioner. The sound attenuator replaces the air intake and discharge grilles and air is taken in and discharged through the attenuator baffles. Air is taken in through the bottom and discharged through the top of the attenuator. Refer to figure 4-5 and install the sound attenuator as follows:

(1) Remove the intake and discharge grilles (Fig. 4-5).

(2) Place the sound attenuator in position on the front of the unit by aligning the grille mounting holes with the attenuator mounting holes.

NOTE: Make sure that the notched edge of the attenuator frame matches the damper door control chain location.

(3) Install the mounting bolts.

c. **Blockoff Plate.** The blockoff plate is provided for installation when the controls are removed for remote control operation. The blockoff plate provided must be used so that no air will enter the lower compartment. Refer to figure 4-2 and install the blockoff plate.

4-5. Installation Instructions

a. **General.** Set air conditioner in a level position to allow proper condensate draining (operation will be satisfactory with unit sitting at a slight angle (5 degree max) and using one of the alternate drain connections.

b. **Locating the Unit.** The front access panel and discharge and intake grilles are removable for normal service and maintenance, and must always be unobstructed to allow sufficient air for condensing purposes. The discharge and intake openings at the front of the unit should be free from obstruction to permit maximum unit capacity.

NOTE: Remove discharge and intake grilles and filter, if unit is to be used with ducts carrying air to and from the conditioned space, install grilles and filter in the duct.

Remove the chemical and biological (CB) inlet cover (Fig. 4-4) if a CB filter unit is to be attached to the unit.

c. **Installing Unit.** Bolt unit to the floor or other flat surface. Refer to base plan (Fig. 4-1) for dimensions. An additional fastening device (Fig. 1-3) is located on the upper rear side for additional mounting rigidity if required. Connect drain hose to drain fitting at bottom of unit to lead condensate away from unit. The units are provided with four drain plugs installed, one on each side. Remove plug prior to installing the drain hose.

d. **Power Sources.** The unit operates on 115 volts, 60 hertz, 1 phase power.

e. **Power Receptacle Connector.** Connector is located at the rear of the unit. (Fig. 1-3) above the condenser coil air inlet. Connect the power supply source to this connector using a proper plug or to an alternate connector. Alternate connector openings are provided at both sides of the unit and front of the unit. Any location may be used by interchanging the power connector at the rear of the unit and one of the cover plates at sides or front of the unit. Be sure to attach cover plate over unused location at rear of the unit to prevent air from being drawn through the opening.

f. **Remote Control.**

(1) General. The control box (Fig. 4-2A) may be removed from the unit and used for remote control operation of the air conditioner. A blockoff plate provided must be used when this control box is used as a remote control.

SECTION II. MOVEMENT TO A NEW WORKSITE

4-6. Dismantling for Movement.

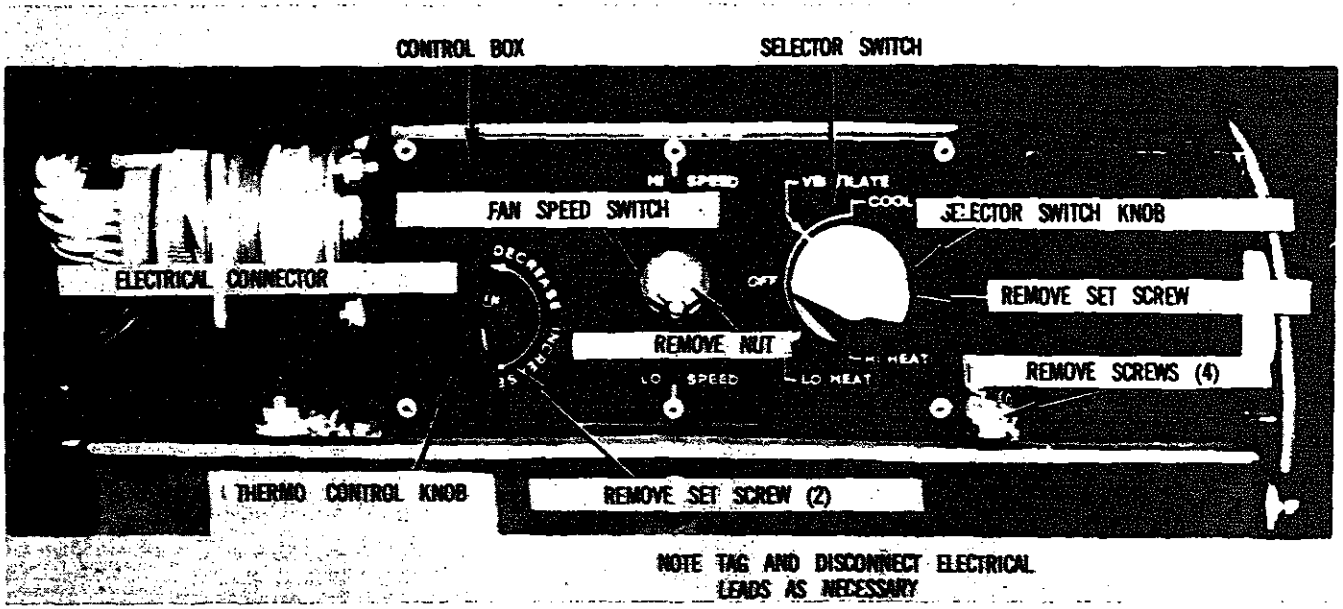
a. **General.**

(1) Shut off electrical power supply to the air conditioner and disconnect power cable from the unit.

(2) Disconnect drain hose from the unit.

NOTE: Disconnect all duct work and remote control cable if used with unit.

(3) Unbolt unit from mounting surface.



CONTROL PANEL:

STEP 1 - REMOVE THERMOSTAT CONTROL KNOB BY LOOSENING SET SCREW.

STEP 2 - REMOVE NUT FROM FAN SPEED SWITCH.

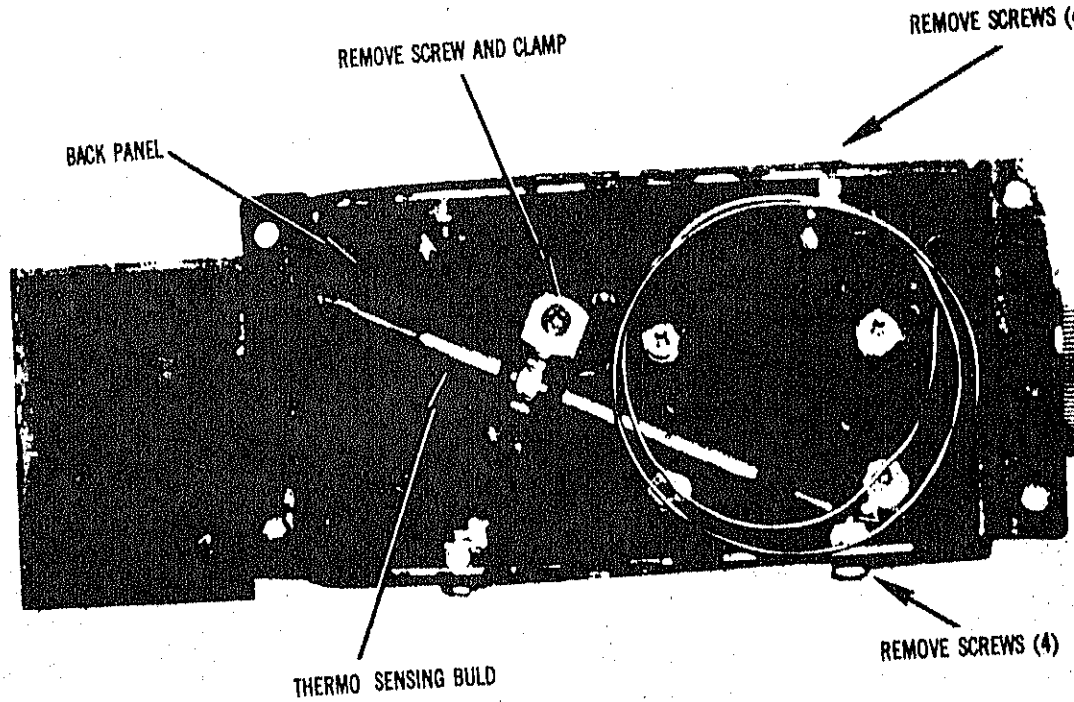
STEP 3 - REMOVE SELECTOR SWITCH KNOB BY LOOSENING SET SCREWS.

STEP 4 - UNSCREW ELECTRICAL CONNECTOR.

STEP 5 - REMOVE CONTROL BOX BY REMOVING SCREWS (4). TS5-4120-345-14/4-2 (1)

Figure 4-2A. Control box and control box back panel removal and installation.

(Sheet 1 of 3)



THERMOSTAT SENSING BULD:

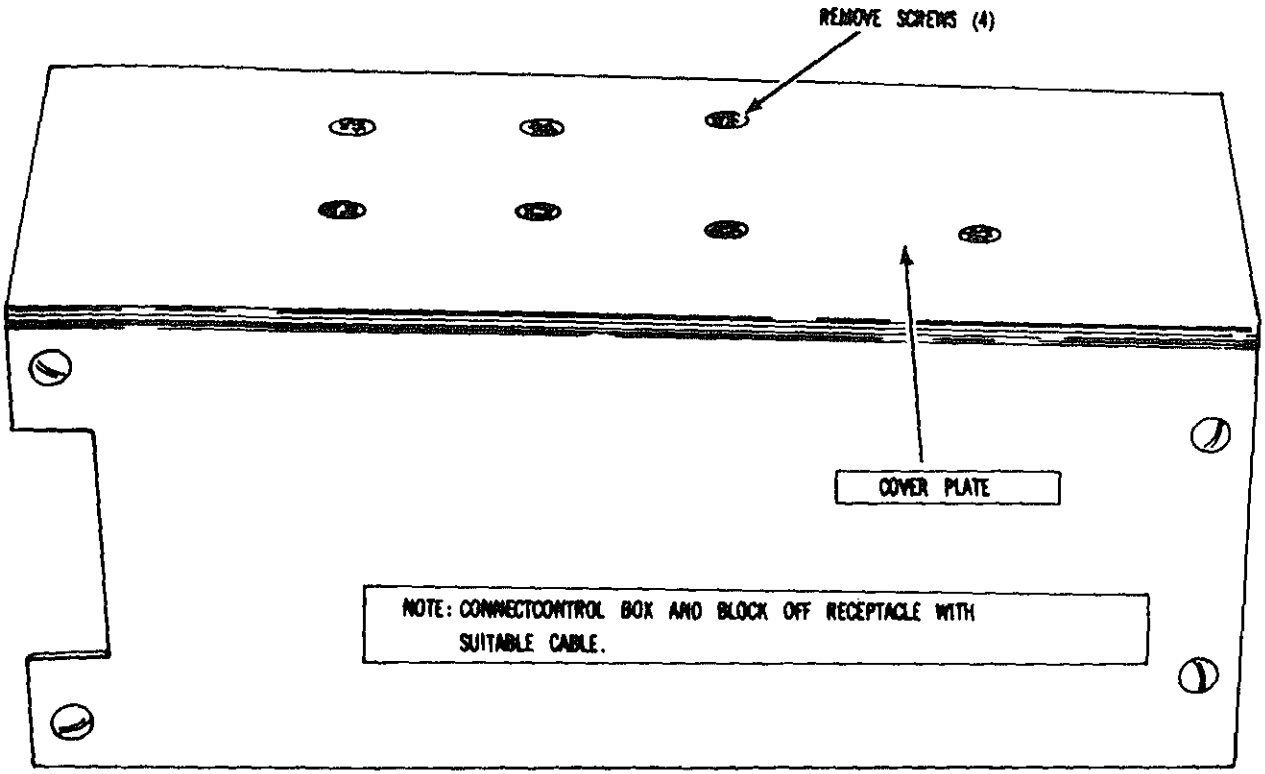
STEP 1 - REMOVE THERMOSTAT SENSING BULD BY REMOVING SCREW AND CLAMP.

STEP 2 - REMOVE BACK PANEL BY REMOVING SCREWS (4). AND LOCKNUTS (4).

STEP 3 - REMOVE THERMOSTAT BY REMOVING SCREWS (4).

TS5-4120-345-14/4-2 ②

Figure 4-2B. Control box and control box back panel, removal and installation (sheet 2 of 3



BLOCK OFF PLATE

STEP 1 - REMOVE COVER PLATE FROM BLOCK OFF PLATE AND INSTALL ELECTRICAL CONNECTOR FROM REAR SECURE WITH SCREWS (4).

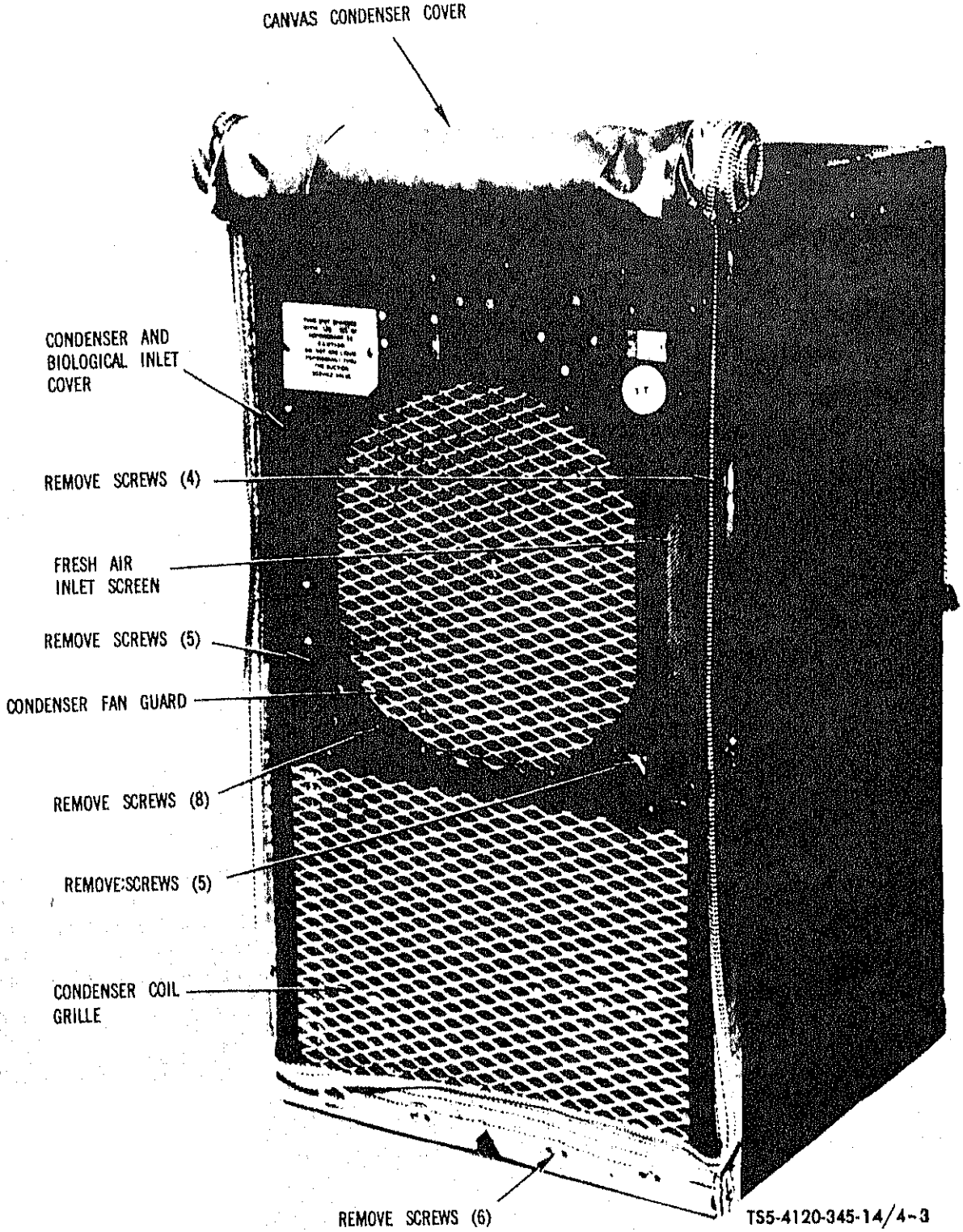
STEP 2 - REPLACE CONTROL BOX WITH BLOCK OFF PLATE AND SECURE WITH SCREWS (4).

TS5-4120-345-14 4-2 3

Table 4-1. Organizational Preventive Maintenance Checks and Services

Q-Quarterly

Item No.	Interval Q	Item to be Inspected	Procedures
1	•	Air Filter	Clean and service as required.
2	•	Evaporator coil	Clean and service as required.
3	•	Condenser Coil	Clean and service as required.
4	•	Fan Motor	Clean and service as required. Turn shaft to be sure bearings are not defective.
5	•	Air Conditioner Unit	Lubricate all movable connections and linkage with SAE 30 oil. Check for loose, missing, or damaged components.


CANVAS CONDENSER COVER
CONDENSER AND BIOLOGICAL INLET COVER
REMOVE SCREWS (4)
FRESH AIR INLET SCREEN
REMOVE SCREWS (5)
CONDENSER FAN GUARD
REMOVE SCREWS (8)
REMOVE SCREWS (5)
CONDENSER COIL GRILLE
REMOVE SCREWS (6)
TS5-4120-345-14/4-3

b. **Short Distance Movement.** Use a forklift and lift the unit at base, or carry unit to new worksite using the recessed handles at sides of unit.

c. **Long Distance Movement.** Crate the air conditioner, providing adequate protection to grilles and control box. Refer to TM 38-250 for instruction in crate fabrication. Provide suitable blocking and tiedowns to prevent unit from shifting during transfer.

4-7. Reinstallation After Movement

Reinstall the air conditioner as instructed in paragraph 4-5.

Section III. REPAIR PARTS, SPECIAL TOOLS, AND EQUIPMENT

4-8. Special Tools and Equipment

No special tools or equipment are required.

4-9. Repair Parts

Repair parts are listed and illustrated in the repair parts and special tools list, TM 5-4120-345-24P, coverir organizational and general support maintenance for the air conditioner.

Section IV. LUBRICATION INSTRUCTIONS

No lubrication is required.

Section V. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (QUARTERLY)

4-10. General

The necessary preventive maintenance services to be performed are listed and described in table 4-1. The seque numbers indicate the minimum inspection requirements. Defects discovered during operation of the unit will be n for further correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is n during operation which would damage the equipment if operation were continued. All deficiencies and shortcom will be recorded together with corrective action taken on DA Form 2404 (Equipment Inspection and Mainten Worksheet) at the earliest possible opportunity.

4-11. Quarterly Preventive Maintenance

Table 4-1 contains a tabular listing of preventive maintenance services which must be performed by org tional maintenance personnel. The sequence numbers are listed consecutively and indicate the minimum requiren Refer to Figure 4-3. The numbers on the figure are also the sequence numbers in Table 4-1.

Section VI. TROUBLESHOOTING

4-12. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the air conditioner and its components. Each trouble symptom stated is followed by a list of probable causes. The possible remedy recommended is described opposite the probable cause. Any trouble beyond the scope of organizational maintenance shall be reported to direct support maintenance.

4-13. Troubleshooting

Troubleshooting of the air conditioner is given in Table 4-2.

NOTE: Before you use this table, be sure you have performed all applicable operating checks.

Table 4-2. Troubleshooting

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION.
1. COMPRESSOR STARTS BUT GOES OUT ON OVERLOAD
Step 1. Listen if condenser fan is operating. Check motor leads and power line going to motor. Correct as required.
Step 2. Condenser coil may be blocked. Clean condenser coil.
2. LITTLE OR NO HEATING CAPACITY
Step 1. Check if selector switch is at HEAT Set switch to HEAT.
Step 2. Check if there is sufficient air movement over evaporator. Clean air filter.
Step 3. Check electrical connections to heater. Correct heater wiring.
3. SUCTION PRESSURE INADEQUATE
Step 1. Check sight glass for appearance of flash gas. Add refrigerant.
4. LOW SUCTION AND DISCHARGE PRESSURES
Step 1. Check sight glass for appearance of flash gas. Report lack of refrigerant to higher maintenance.
Step 2. Check if air filter is clean. Clean air filter.

Section VII. RADIO INTERFERENCE SUPPRESION

This section is not applicable to this equipment.

Section VIII. MAINTENANCE OF HOUSING ASSEMBLY

4-14. General

The air conditioner is constructed with removable aluminum panels. The front access panel provides access to th junction box, control panel, and access fittings. A discharge grille protects the evaporator and controls the direction discharge of conditioned air. The intake grille protects the air conditioning filter and regulates the amount of air retur ed to the unit. The condenser coil grille and fan guard protects the condenser coil and fan. A fresh air inlet screen pe mits the entry of outside air and is controlled by the damper door with the control spring and chain. The cover pan covers the top of the unit.

WARNING: *Disconnect the air conditioner from the power source before performing any maintenance on th components of the unit.*

4-15. Top Panel, Discharge Grille, Intake Grille, and Front Access Panel

a. **Removal.** Refer to Figure 4-5, remove panels and grilles.

b. **Inspection and Repair.** Inspect for minor dents, and cracked or chipped paint. Repair minor damage, repair

c. **Installation.** Refer to Figure 4-5 to install panels and grilles.

4-16. *Canvas Condenser Cover*

a. **Removal.** *Refer to Figure 1-3. Remove retaining hardware and lift off cover.*

b. **Inspection and Repair.** Inspect for rips or tears. Repair with waterproof tape.

c. **Installation.** Place cover in position and secure with retaining hardware.

4-17. Fresh Air Inlet Screen, Chemical and Biological Inlet Screen, Condenser Fan Guard and Condenser Coil Grille

a. **Removal.** Refer to Figure 4-4, and remove fresh air inlet screen, CB inlet cover, condenser fan guard, a condenser coil grille.

b. **Inspection.** Inspect for minor dents and cracked or chipped paint. Repair minor damage, repaint.

c. **Installation.** Install the fresh air inlet screen, CB inlet cover, fan guard, and condenser coil grille and scre Refer to Figure 4-4.

Section IX. GENERAL ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

4-18. Compressor

Test for continuity across motor windings with multimeter set on OHMS. Refer to wiring diagram, Figure 1 to establish points of continuity.

4-19. Fan Motor

a. **Removal.** Refer to Figure 4-6, and remove the motor.

b. **Inspection and Testing.**

(1) Inspect for dents, cracks, and broken or damaged leads.

(2) Test for continuity across windings with a multimeter set on OHMS. Refer to Figure 1-4, to establis points of continuity.

c. **Installation.** Refer to Figure 4-6 and install motor.

4-20. Capacitors

a. **Removal.** Refer to Figure 4-7 and remove capacitors.

b. **Inspection and Testing.**

(1) Inspect for cracked case and broken or damaged contacts.

(2) Use a multimeter set on OHMS. Refer to wiring diagram, Figure 1-4.

A full scale reading should be made with a steady return to zero.

c. **Installation.** Refer to Figure 4-7 and install capacitors.

4-21. Fan Motor Relays.

a. **General.** Fan motor relays are located in the top of the unit, Figure 4-8. The relay starts the fan motor an controls the high and low speeds.

b. **Removal.** Refer to Figure 4-8 and remove the fan motor relay.

c. **Inspection and testing.**

(1) Inspect for pitted or burned contacts.

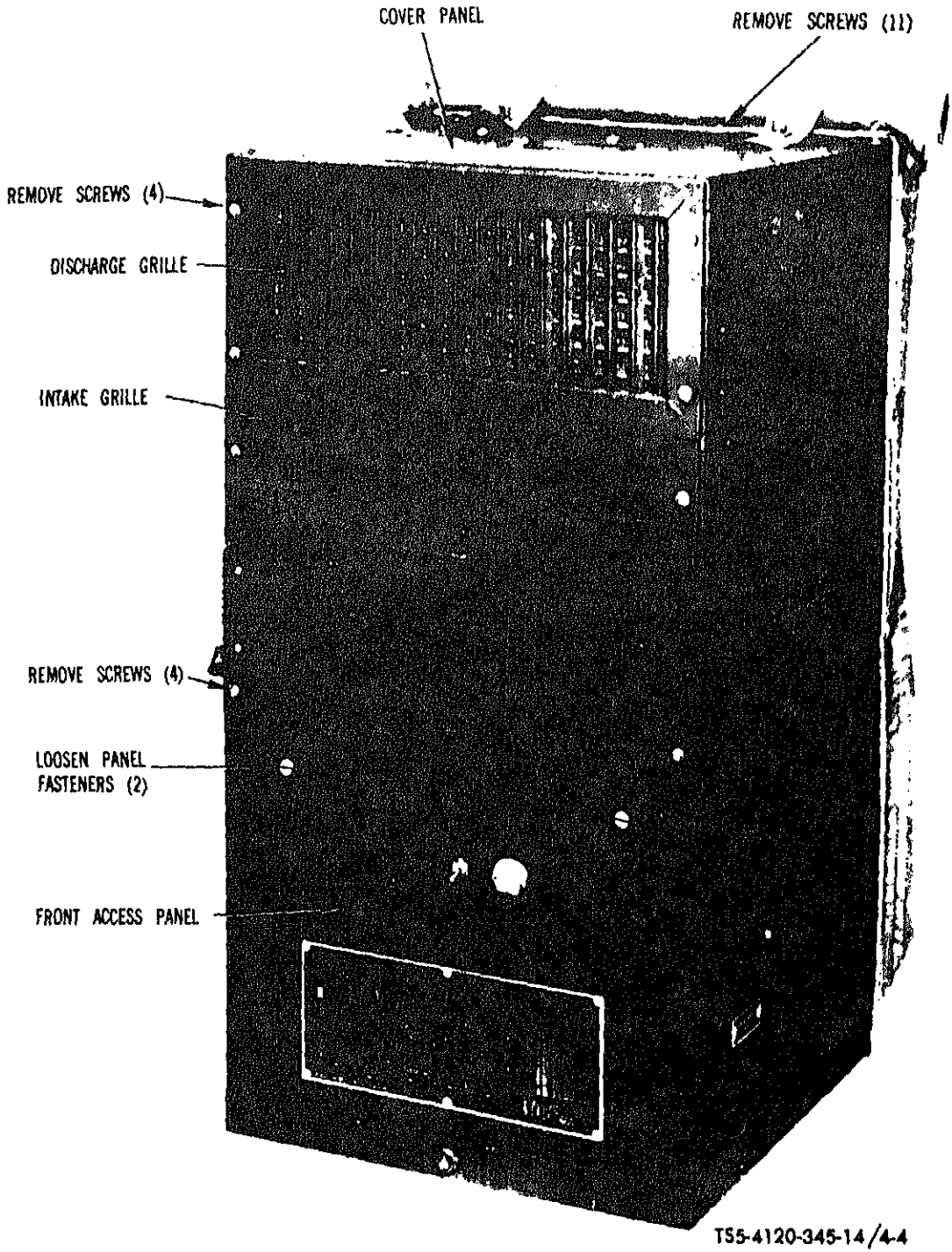
(2) Test for continuity across coil with multimeter set on OHMS. Refer to wiring diagram Figure 1-4 t establish points of continuity.

d. **Installation.** Refer to Figure 4-8 and install relay.

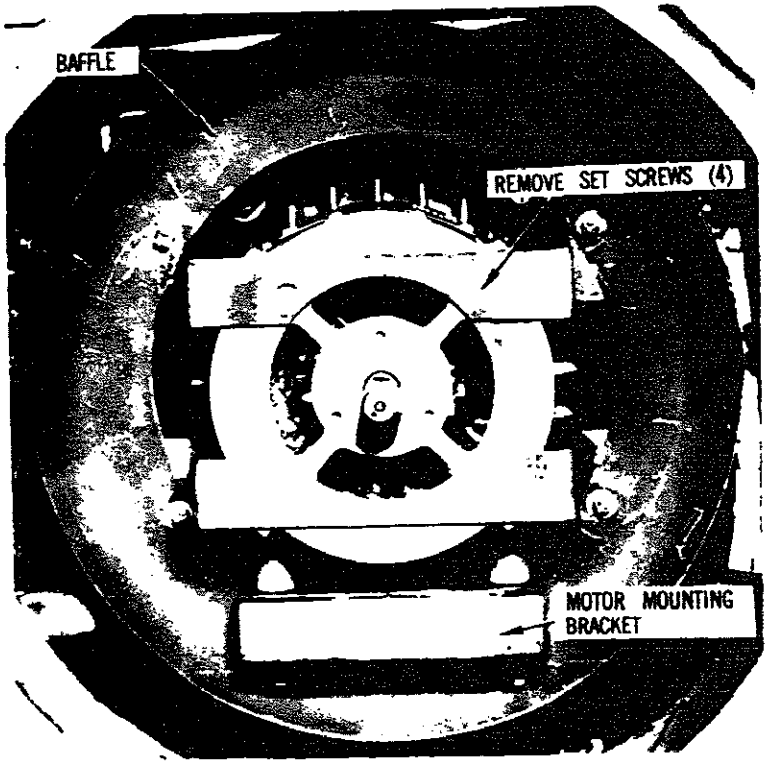
4-22. Control Box

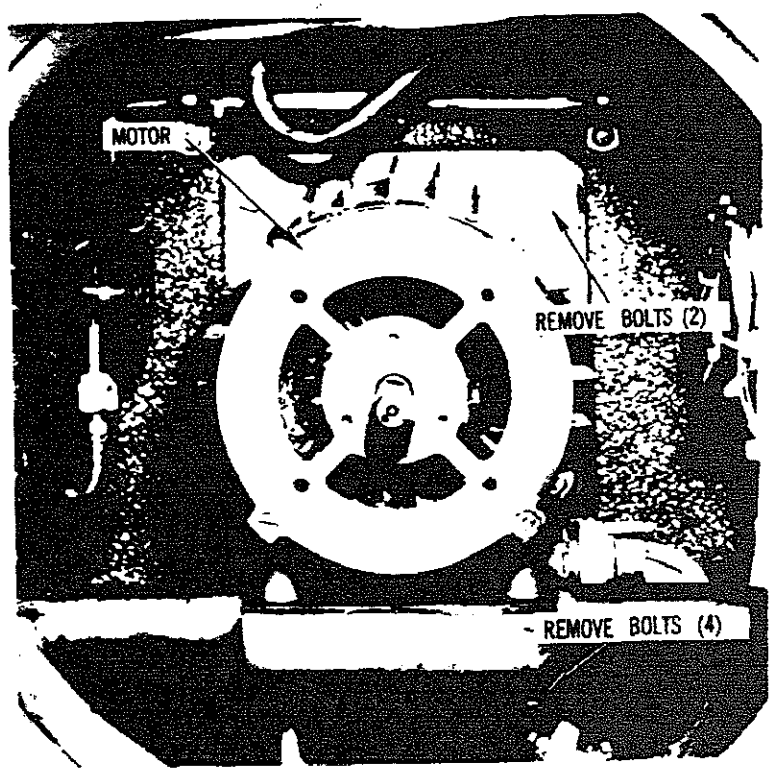
a. **General.** The control box houses the selector switch, thermostat, and hi-lo fan speed switch and is mounte on the junction box. The selector switch is a manually operated, five-position switch. Automatic control of bot heating and cooling cycles is provided by the thermostat. The hi-lo fan speed switch controls the fan speed. The contr box may be used in a remote position by utilizing a blockoff plate and a remote control cable, Figure 4-2A and C

b. **Inspection.** Inspect for loose knobs and switches.



TS5-4120-345-14/4-4

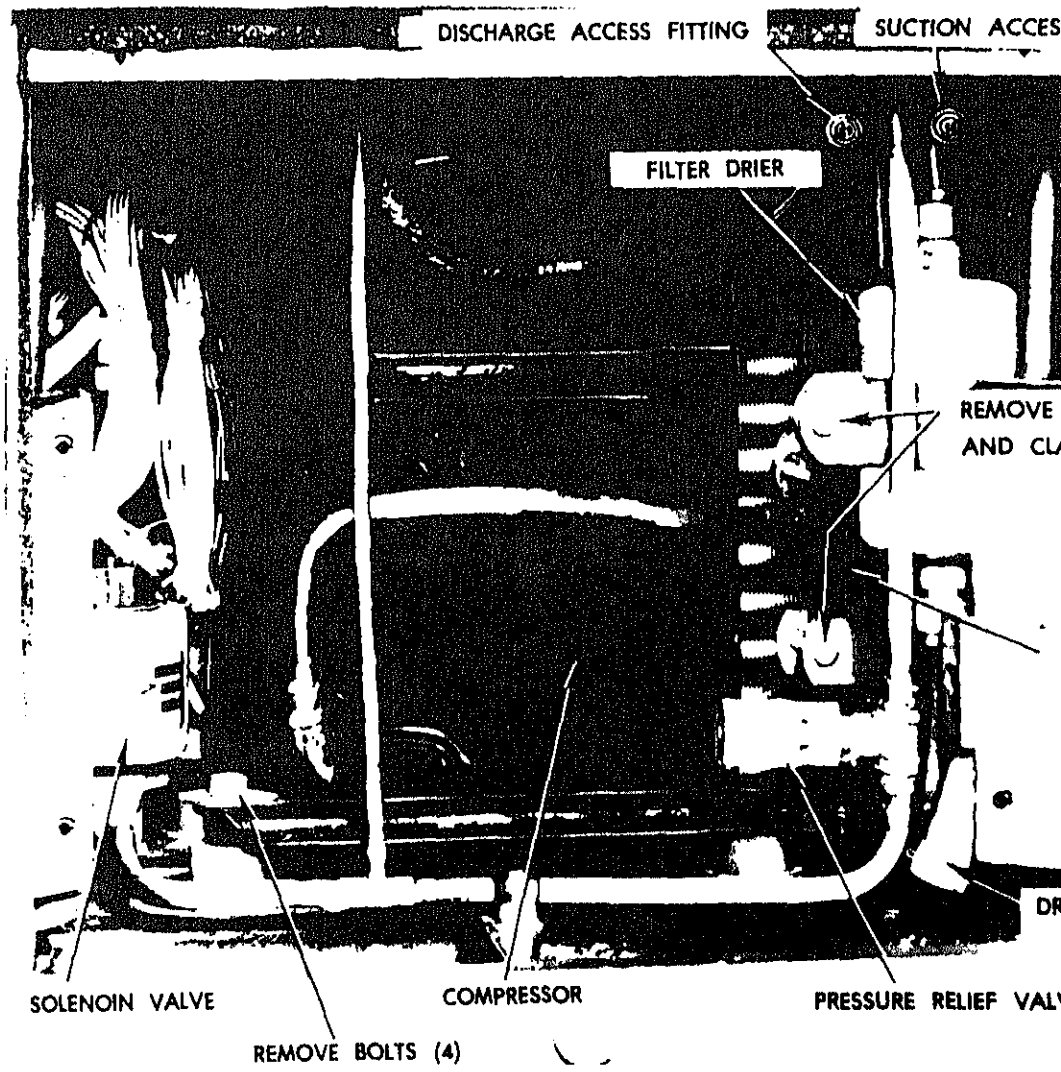




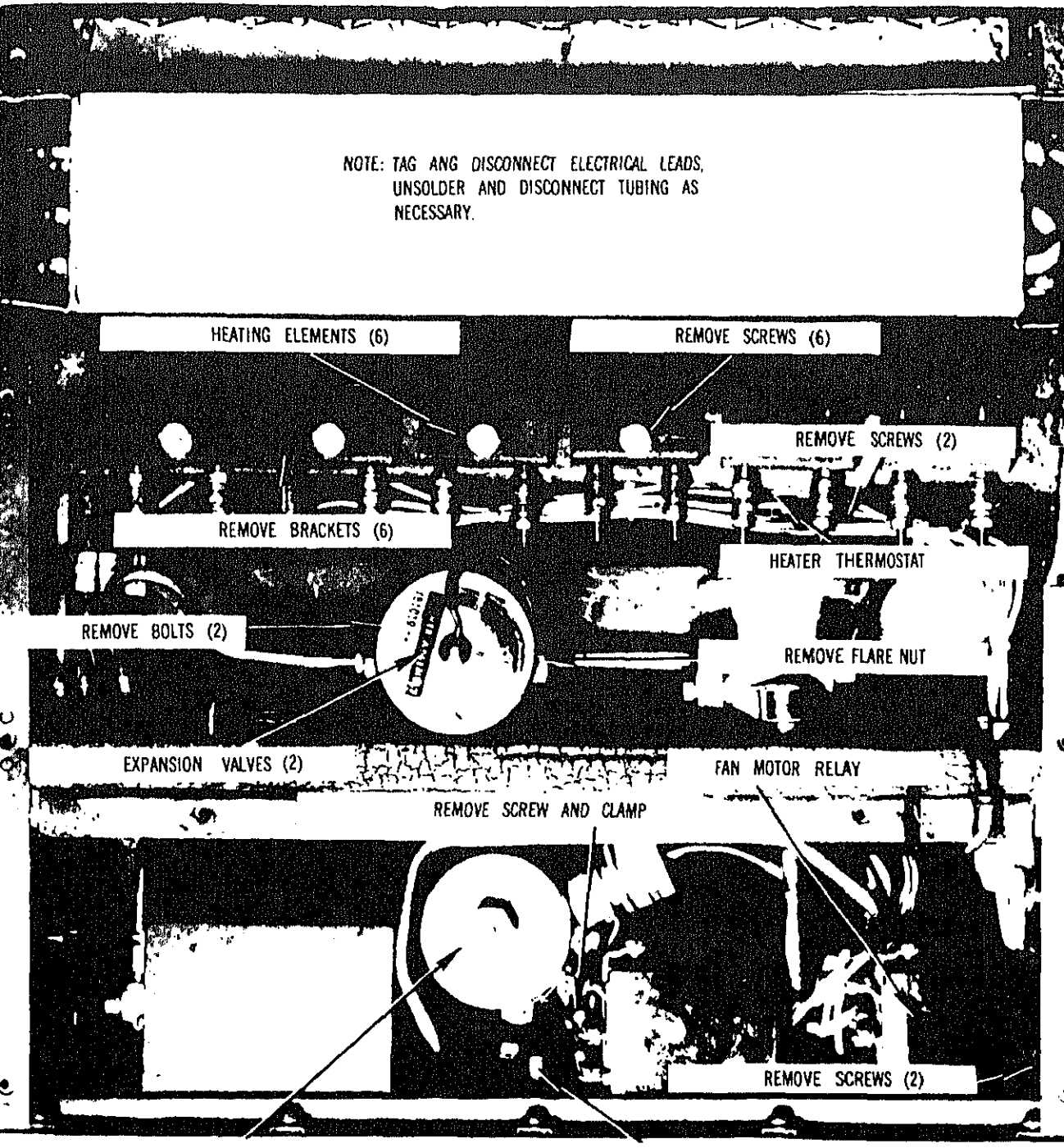
NOTE: TAG AND DISCONNECT ELECTRICAL LEADS AS NECESSARY.

TS5-4120-345-14/4-5

Figure 4-5. Fan Motor removal and installation.



TS5-4120-345-14/


NOTE: TAG ANG DISCONNECT ELECTRICAL LEADS, UNSOLDER AND DISCONNECT TUBING AS NECESSARY.
HEATING ELEMENTS (6)
REMOVE SCREWS (6)
REMOVE SCREWS (2)
REMOVE BRACKETS (6)
HEATER THERMOSTAT
REMOVE BOLTS (2)
REMOVE FLARE NUT
EXPANSION VALVES (2)
FAN MOTOR RELAY
REMOVE SCREW AND CLAMP
REMOVE SCREWS (2)
EQUALIZER SOLENOID VALVE
PRESSURE REGULATING

4-23. Selector Switch

a. **Removal.** Refer to Figure 4-2A and remove selector switch.

b. **Testing.** Test for continuity across coils using multimeter set on OHMS. Refer to wirin to establish points of continuity.

c. **Installation.** Refer to Figure 4-2A and install selector switch.

4-24. Hi-Lo Fan Speed Switch

a. **Removal.** Refer to Figure 4-2A and remove fan speed switch.

b. **Testing.** Test for continuity. Refer to wiring diagram Figure 1-4, to establish points of con

c. *Installation. Refer to Figure 4-2A and install fan speed switch.*

4-25. Thermostat

a. **Removal.** Refer to Figure 4-2A and remove thermostat.

b. **Testing.** Test for continuity using multimeter set on OHMS. Refer to wiring diagram Fi points of continuity.

c. **Installation.** Refer to Figure 4-2A and install thermostat.

4-26. Junction Box

a. **Removal.** Refer to Figure 4-9 and remove junction box.

b. **Installation.** Refer to Figure 4-9 and install junction box.

4-27. Fuses

a. **Removal.** Refer to Figure 4-9 and remove fuses from holders located in junction box.

b. **Inspection and Testing.**

(1) Inspect for cracked or broken case.

(2) Test for continuity through fuse with multimeter set on OHMS. Refer to the wiring to establish points of continuity.

c. **Installation.** Refer to Figure 4-9 and install fuse in fuseholder.

4-28. Transformer

a. **Removal.** Refer to Figure 4-9 and remove transformer.

b. *Inspection and Testing.*

(1) Inspect for broken or cracked case and broken or damaged contacts.

(2) Test for continuity through both primary and secondary sides of transformer with multimeter set on OHMS. Refer to wiring diagram Figure 1-4, to establish points of continuity.

c. **Installation.** Refer to Figure 4-9 and install transformer.

4-29. Circuit Breaker

a. **General.** The circuit breaker protects the compressor from continuous overcurrent and short circuts. It is located in the lower right corner of the junction box. Refer to Figure 4-9, push switch lever up to reset.

b. **Removal.** Refer to Figure 4-9 and remove the circuit breaker.

c. **Testing.** Refer to Figure 4-9 and tag and disconnect the leads. Test the circuit breaker for continuity with a multimeter set on OHMS. Refer to wiring diagram Figure 1-4, to establish points of continuity.

4-30. Compressor Motor Relay and Electrical Heater Relay

a. **General.** Both relays are located in the junction box Figure 4-9. A motor relay starts the compressor motor and a heater relay is connected to the electrical heaters.

b. **Removal.** Refer to Figure 4-9 and remove the relays.

c. **Inspection and Testing.**

(1) Inspect for pitted or burned contacts.

(2) Test for continuity across coil with a multimeter set on OHMS. Refer to wiring diagram Figure 1-4, to establish points of continuity.

d. **Installation.** Refer to Figure 4-9 and install relays.

4-31. Rectifier

a. **General.** The rectifier changes alternating current to direct current.

b. **Removal.** Refer to Figure 4-9 and remove the rectifier.

c. **Inspection and Testing.**

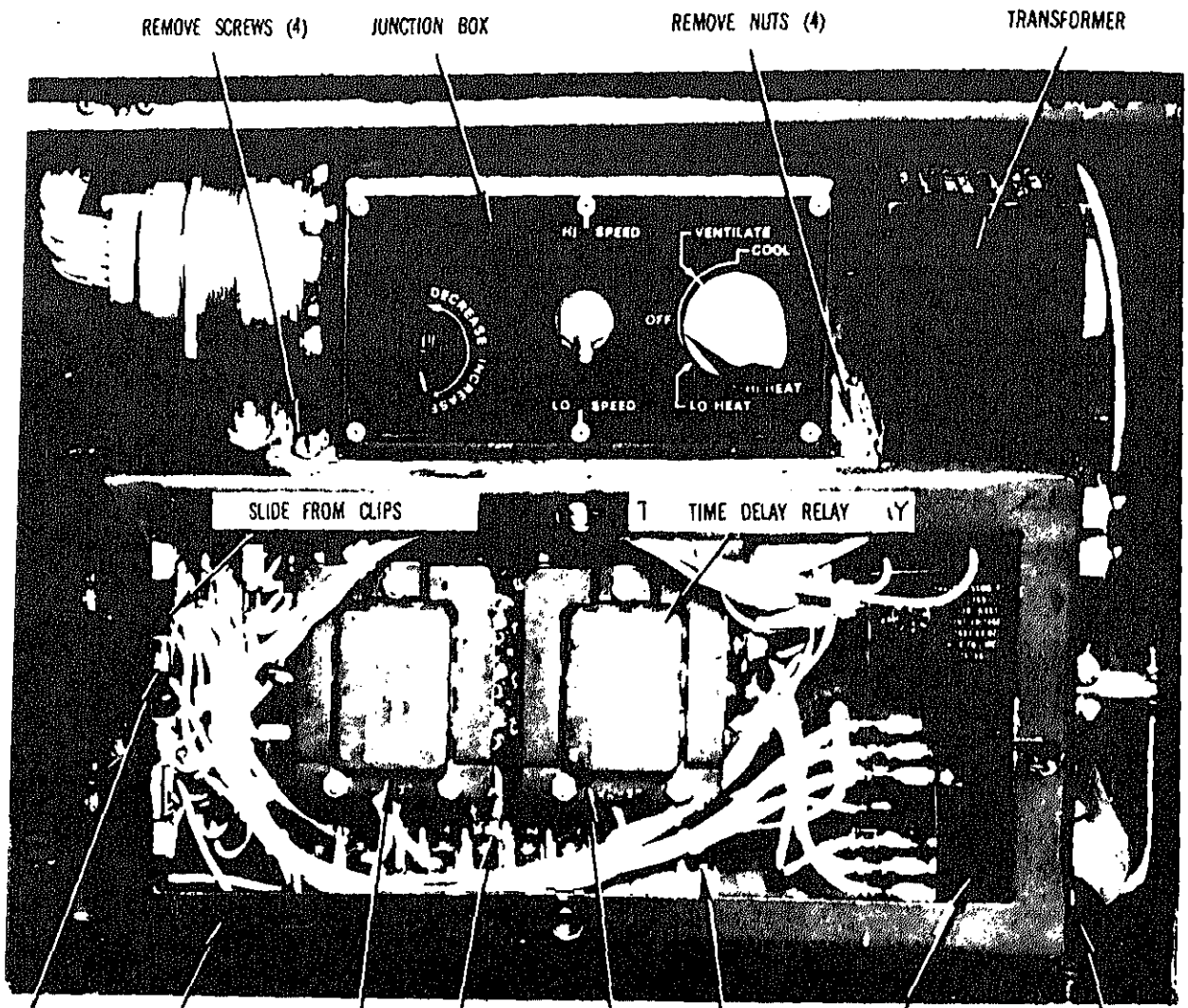
(1) Inspect for cracked or broken casing and burned or damaged contacts.

(2) Test for continuity with multimeter set on OHMS. Refer to wiring diagram Figure 1-4, to establish points of continuity.

d. **Installation.** Refer to Figure 4-9 and install rectifier.

4-32. Heater Elements

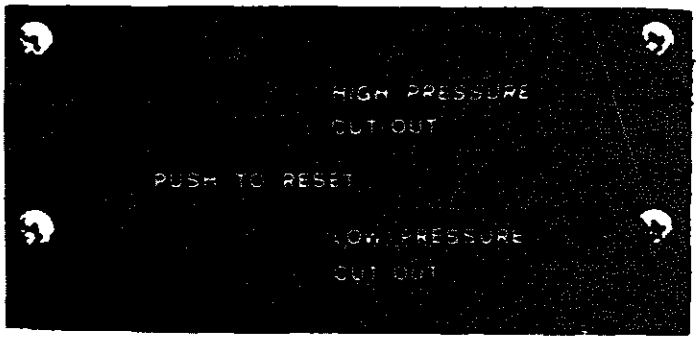
a. **General.** The electrical resistance heaters are mounted directly behind the evaporator coil. These heaters provide the heat called for by the thermostat to maintain the required temperature of the conditioned air. The heaters provide two ranges of heating and are manually controlled by placing the selector switch in the proper position (LO-HEAT or HI-HEAT) to maintain the required temperature.



NOTE: TAG AND DISCONNECT ELETRICAL LEADS AS NECESSARY:

HIGH PRESSURE SWITCH

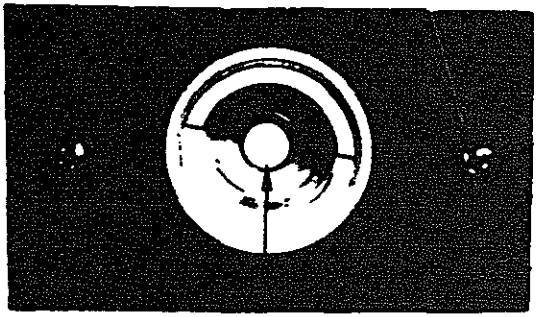
REMOVE SCREWS (4)



LOW PRESSURE SWITCH

A. LOW PRESSURE AND HIGH PRESSURE SWITCH

REMOVE SCREWS (2)

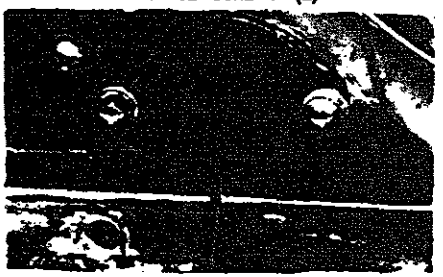


SIGHT GLASS

B. SIGHT GLASS

NOTE: TAG AND DISCONNECT ELECTRICAL LEADS ,UNSOLDER AND DISCONNECT TUBING AS NECESSARY

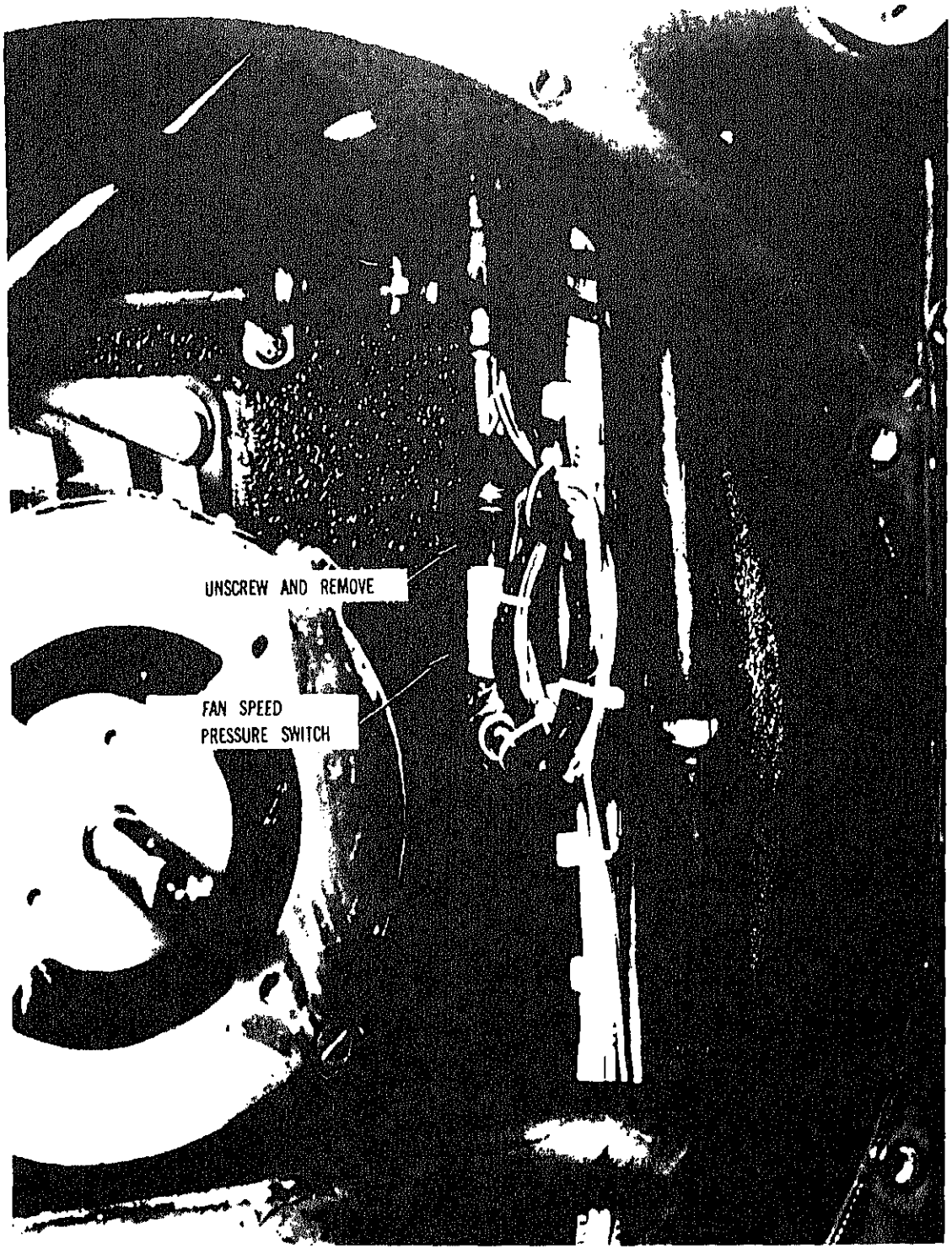
REMOVE SCREWS (2)



OUTSIDE AIR THERMOSTAT

C. OUTSIDE AIR THERMOSTAT

TS5-4120-345-14/4-9



NOTE: TAG AND DISCONNECT ELECTRIC LEADS,
AND UNSL UNSOLDER AND DISCONNECT
TUBING AS NECESSARY.

(2) Test for continuity across elements with multimeter set on OHMS. Refer to wiring diagram Figure 1-4 to ablish points of continuity.

d. **Installation.** Refer to Figure 4-8 and install heating elements.

3. High Pressure Switch

a. **General.** The high pressure switch prevents the compressor from operating if the head pressure exceeds 445 g (Fig. 4-10).

b. ***Inspection and Testing.***

(1) Inspect for broken or damaged leads and kinked or broken capillary tubing.

(2) Test for continuity across switch with multimeter set on OHMS. Refer to wiring diagram Figure 1-4 to :ablish points of continuity.

34. Lo Pressure Switch

a. **General.** The low pressure switch prevents the compressor from operating if the suction pressure drops below ; psig (Fig. 4-10).

b. **Inspection and Testing.**

(1) Inspect for broken or damaged leads and kinked or broken capillary tubing.

(2) *Test for continuity across switch with multimeter set on* OHMS.

efer to wiring diagram Figure 1-3 to establish points of continuity.

·35. Fan Speed Pressure Switch

a. **Inspect for broken or damaged contacts (Fig. 4-11).**

b. Test for continuity with multimeter set on OHMS. Refer to wiring diagram Figure 1-3 to establish points ontinuity.

4-36. Outside Air Thermostat

a. **General.** The outside air thermostat is mounted to the rear housing of the air conditioner. It prev pressor from starting when the outside temperature is below 50 degrees F. This prevents the unit from t at a time when low condensing and suction pressures will hamper system operation.

b. **Removal.** Refer to Figure 4-10 and remove the outside air thermostat.

c. **Testing.** Test the thermostat for continuity with a multimeter set on OHMS. Refer to wiring d 1-3 for points to establish continuity.

d. **Installation.** Refer to Figure 4-10 and install outside air thermostat.

4-37. Electric Heater Thermostat

a. **General.** The electric heater thermostat (Fig. 4-8) protects the heater elements from overheating.

b. **Removal.** Refer to Figure 4-8 and remove the electrical heater thermostat.

c. **Testing.** Test for continuity with multimeter set on OHMS. Refer to wiring diagram Figure 1- points of continuity.

d. **Installation.** Refer to Figure 4-8 and install electrical heater thermostat.

4-38. Refrigerant Piping

a. **Inspection.** Inspect refrigerant piping for kinking, holes, and unsatisfactory welding.

b. **Testing.**

(1) Halide torch leak detector. The preferred method of field testing for leaks in the refrigera by using a halide torch. Operate the air conditioner, paragraph 2-2, and pass the exploring tube slowly fittings, mechanical couplings, and valves. If refrigerant is leaking from the system, the flame of the tor from blue to green when the leak is small. If the leak is large, the flame will be a deep blue with a red flame may be entirely extinguished.

(2) Soap solution method. Operate the air conditioner, paragraph 2-2. Brush all points of po with soap solution. Watch for bubbles. Follow a definite sequence so that all joints will be thoroughly the solution from all joints and mark any spot where leakage occurs.

4-39. Liquid Line Solenoid Valve

a. **General.** The liquid line solenoid valve is automatically actuated by the thermostat and contro refrigerant to the evaporator coil.

b. **Inspection.** Inspect for cracked or broken casing and damaged or broken terminals, Figure 4-7.

c. **Testing.** Test for continuity across coil with multimeter set on OHMS. Refer to wiring diagram establish points of continuity.

4-40. Equalizer Solenoid Valve

a. **General.** The equalizer solenoid valve is actuated by the on-off switch and serves to equalize sy during shutdown.

b. **Inspection.** Inspect for cracked or broken casing and damaged or broken terminals, Figure 4-8.

c. **Testing.** Test for continuity across coil with multimeter set on OHMS. Refer to wiring diagram Figure 1-3 to establish points of continuity.

4-41. Access Fittings

a. **General.** The two access fittings (suction line and discharge line) provide access to the refrigerant system, Figure 4-7.

b. **Inspection.** Inspect for cracked casing or damaged threads.

4-42. Pressure Relief Valve

a. **General.** Pressure relief valve (Fig. 4-7) is located on a tee just below the filter-drier. The pressure relief valve protects the refrigerant system from excessive pressure.

b. **Inspection.** Inspect for cracked or broken casing.

4-43. Pressure Regulating Valve

The evaporator pressure regulating valve, Fig. 4-8, regulates refrigerant pressure in the evaporator to prevent coil freeze up. The valve is preset to establish a minimum pressure in the evaporator of 58 psig.

4-44. Expansion Valves

a. **General.** A 1-ton expansion valve controls the rate of flow of liquid refrigerant into the evaporator coil during the cooling cycle of operation (Fig. 4-8). The one-half ton expansion valve functions when the unit is in the bypass cycle of operation.

b. **Inspection.**

(1) Check for loose or leaking connections.

(2) Make sure the thermal bulb is securely fastened and is covered with rubber insulation.

4-45. Sight Glass

a. **General.** The sight glass indicates the refrigerant moisture content. A shortage of refrigerant is indicated by flash gas in the sight glass (Fig. 4-10).

b. **Inspection.** Inspect for excessive moisture in refrigerant. Excessive moisture is indicated by the changing of the color code from green to yellow.

4-46. Liquid Receiver

a. **Inspection.** Inspect for cracks or broken casing, Figure 4-7.

4-47. Evaporator Coil

a. **General.** The evaporator coil is mounted on the casing, directly behind the discharge grille. The coil must be removed from the air conditioner for repair or replacement. The mixture of fresh air and recirculated air is passed through the evaporator coil and forced into the conditioned air space by the evaporator fan.

b. **Testing.** Refer to paragraph 4-38 and test with halide torch for refrigerant leaks.

c. **Inspection and Cleaning.**

(1) Inspect coil for bent fins, cracks, or breaks, solder any cracks. Straighten bent fins with coil comb or t
nose pliers.

(2) Clean coil with low pressure, compressed air.

d. **Removal.**

(1) Remove top panel and discharge grille, refer to paragraph 4-15.

(2) Remove evaporator coil.

e. **Installation.**

(1) Install the evaporator coil.

(2) *Install the top panel and discharge grille, refer to paragraph* 4-15.

4-48. Condenser Coil

a. **General.** The condenser coil is mounted on the bottom rear of the casing, directly behind the condenser f
The coil must be removed from the air conditioner for repair or replacement. The coil is made from copper tube a
aluminum fin and is of fin-tube configuration.

b. **Testing.** Refer to paragraph 4-38 and test with halide torch for refrigerant leaks.

c. **Inspection and Cleaning.**

(1) Inspect coil for bent fins, cracks, or breaks. Solder any cracks. Straighten bent fins with coil comb
thin nose pliers.

(2) Clean coil with low pressure compressed air.

4-49. Drain Tubes

a. **Removal.**

(1) Remove front panel access panel, paragraph 4-15.

(2) Pull out junction box and control box, *refer to paragraphs* 4-22 and 4-26.

(3) Unscrew clamps holding drain tubes to unit and remove drain tubes, Figure 4-7.

b. **Inspection and Servicing.**

(1) Inspect tubes for obstructions, kinks, or holes.

(2) Install junction box and control box, paragraphs 4-22 and 4-26.

(3) *Install front access panel, paragraph* 4-15.

4-50. Air Filter

a. **Removal.** Refer to Figure 3-2 and remove air filter.

CHAPTER 5. DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

Section I. REPAIR PARTS, SPECIAL TOOLS, AND EQUIPMENT

5-1. *Special Tools and Equipment*

No special tools and equipment are required to perform direct support and general support maintenance or air conditioner.

5-2. Repair parts are listed and illustrated in the repair parts and special tools list, TM 5-4120-345-24P, covering d support and general support maintenance for the air conditioner.

Section II. TROUBLESHOOTING

5-3. General

This section contains troubleshooting information for locating and correcting most of the operating trou which may develop in the air conditioner. Each malfunction for an individual component, unit, or system is follo by a list of test or inspections which will help you to determine corrective action to take. You should perform tests, inspections and corrective actions in the order listed.

This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

5-4. *Direct Support and General Support Troubleshooting*

Troubleshooting of the air conditioner is given in Table 5-1.

Table 5-1. Troubleshooting

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
1. COMPRESSOR WILL NOT START Step 1. The power is not connected to the compressor. Check compressor relay, paragraph 4-30. Check fuses, paragraph 4-27. Check circuit breaker, paragraph 4-29. Step 2. The thermostat is set too high. Reset thermostat, Figure 4-2A.

Table 5-1. Troubleshooting (Cont).

Step 3. Check for loose electrical connection or faulty wiring.
Tighten connection or rewire if necessary.

Step 4. Check if compressor motor is burned out.
Replace compressor (para 5-13).

Step 5. Check if high and low pressure switches are good.
Replace defective pressure switch (paras 4-33 and 4-34).

Step 6. Check if thermostat is operating correctly.
Replace defective thermostat (para 4-25).

2. COMPRESSOR CYCLES INTERMITTENTLY

Step 1. Check tubing to low pressure switch.
Clean if clogged (para 3-34).

Step 2. Check setting of low pressure switch.
Reset if setting is too high.

Step 3. Check if there is sufficient refrigerant in system.
Add refrigerant (para 5-9).

Step 4. Check for dirt or restriction in tubing to pressure switch.
Clean or correct restriction.

Step 5. Check if pressure switch is faulty.
Repair or replace pressure switch (paras 4-33 and 4-34).

Step 6. Check for excess refrigerant.
Remove excess refrigerant (para 5-9).

3. HIGH DISCHARGE PRESSURE

Step 1. Check if condenser fan is operating.
Check fan motor and replace if defective (para 4-19).

Step 2. Check for excess refrigerant.
Remove excess refrigerant (para 5-9).

Step 3. Check for air in system (para 5-9).
Evacuate system.

4. LOW DISCHARGE PRESSURE

Step 1. Check if suction line is obstructed.
Clean the line.

5. FLOODING

Step 1. Check if expansion valve is improperly set or defective.
Reset or replace expansion valve (para 4-44).

6. LOW SUCTION PRESSURE

Step 1. Check for sufficient refrigerant.
Add refrigerant (para 5-9).

Table 5-1. Troubleshooting (Cont).

Step 2. Check for excessive superheat.
Reset expansion valve (para 4-44).

7. COMPRESSOR NOISY
Step 1. Defective compressor.
Replace compressor (para 5-13).

Step 2. Check if bearings are worn.
Replace compressor (para 5-13).

8. HISSING
Step 1. Check for low refrigerant.
Add refrigerant (para 5-9).

9. COLD COMPRESSOR
Step 1. Check refrigerant charge and expansion valves.
Replace defective expansion valve (para 4-44).

10. CYLINDERS AND CRANKCASE SWEATING
Step 1. Probably due to floodback. Check refrigerant charge and expansion valves.
Adjust refrigerant charge or replace defective expansion valve.

11. HIGH CRANKCASE TEMPERATURE
Step 1. Expansion valve set too high.
Reset expansion valve (para 4-44).

12. LITTLE OR NO HEATING CAPACITY
Step 1. Wiring and wiring harness may be defective.
Replace defective wiring (para 5-10).

5-5. System Losing Cooling Capacity

If the system is losing cooling capacity, or is in some way not functioning properly, a check of system operating pressure will frequently lead to the cause of malfunction. Install pressure gages on access fittings of suction and discharge lines and expose gages to system pressure. Compare gage readings with normal ranges of systems pressures listed in table 4-2.

Table 5-2. Normal Operating Pressures

Return air to unit	90 F/75 F WB		80 F/67 F WB
Outdoor ambient	120 F	125 F	95 F
GAGE PRESSURE			
Suction	85-95	87-97	70-80
Discharge	387-395	406-416	253-263

Section III. GENERAL MAINTENANCE

5-6. General

The air conditioner, after it is started, is automatic in operation. The relationship of the automatic components, controls, and instruments, is explained in the operational analysis for maintenance of the air conditioner (para 5-7). A

Figure 5-1. Refrigerant flow diagram. (Located in back of manual)

5-7. Analysis of Operation

a. General. The type and degree of air conditioning provided by the unit is controlled by a five position selecto switch (fig. 4-2A), a thermostat, and a hi-lo fan speed switch.

(1) When the selector switch is in the OFF position, the entire circuit is dead.

(2) Placing the selector switch in the HI-HEAT position actuates the fan motor with all six heater element being under the control of the thermostat. If the air temperature falls below the set point of the thermostat, the contro contacts close, energizing the evaporator contactor which supplies power to the heaters through the normally closed contacts of the evaporator heater thermostat.

(3) Moving the selector switch to the LO-HEAT position presents the same control sequence but reduces the heating capacity of the unit by supplying power to three of the heater elements only.

(4) The fan motor starts when the selector switch is placed in the VENTILATE position.

(5) In the COOL position, the fan motor is in operation and the compressor motor contactor is energized through the contacts of the thermostatic switch. The energized contactor supplies power to the compressor through the normally closed contacts of the circuit breaker and the compressor overload protector. After the fan motor and compressor overload protector. After the fan motor and compressor have started, the operation of the refrigeran unit is controlled by the thermostat. Sensing a rise in the air temperature above the set point, the thermostat opens its contacts, deenergizing the liquid line solenoid valve. This positions the valve for cooling service. Sensing a fall in the air temperature below the set point, the contacts of the termostat close, energizing the valve. This positions the system for bypass service.

(6) The HI-LO fan speed switch controls the speed of the fan motor and the fans.

b. Cooling Cycle of Operation.

(1) The fan motor and compressor run continuously, whether the thermostat is calling for cooling or not when the unit is set to operate on the cooling cycle of operation. This feature provides a constant electrical load thus preventing voltage fluctuations within the system.

(2) Bypass cycle of operation. When the conditioned air temperature falls below the thermostat setting, the circuit which controls the solenoid valves is energized causing:

(a) The hot gas bypass line to flow discharge gases through the evaporator pressure regulator bypassing a major part of the compressor refrigerant vapor directly back to the suction side of the compressor.

(b) To prevent frost from forming on the evaporator? a back pressure regulating valve is provided to prevent the suction pressure from decreasing to a pressure of 58 psig which corresponds to a temperature of less than 32 degrees F.

from the system. Refer to paragraph 5-9 for instructions.

b. After discharging the system, allow the tubing to warm to the ambient temperature before opening the system; this delay will help prevent the formation of condensation on the inside wall of the tubing. Plug or cap all openings as a part is removed to minimize the entry of dirt and moisture into the system.

c. Use a silver solder on all soldered connections. Silver solder with a 50 percent silver capacity and a melting point of approximately 1300 degrees F is recommended. Continually pass dry nitrogen through the tubing or connections being soldered to prevent formation of harmful copper oxides.

5-9. Servicing the Refrigerant System

a. **Testing Refrigerant System for Leaks.** Refer to paragraph 4-38, and test refrigerant system for leaks.

b. **Releasing Refrigerant for Service.** Release refrigerant slowly to a well vented atmosphere. Adjust the release so that a vaporized discharge is made to avoid loss of refrigerant oil.

c. **Evacuating the Refrigerant System.**

(1) **General.** Opening the system to the atmosphere will cause entry of air and moisture into the system. After any servicing operation, when the system is opened, the entire system should be evacuated before recharging with refrigerant.

(2) **Evacuation.**

(a) Connect hose assemblies of evacuation gage manifold to discharge valve access fitting and to the suction access fitting of the unit, refer to figure 4-7.

(b) Connect vacuum pump to center hose of gage manifold.

(c) Evacuate pump down to 100 microns.

(d) Break vacuum by admitting refrigerant, subparagraph below.

CAUTION: Do not use the compound gage as an indicator for satisfactory vacuum pressure.

d. **Charging the Refrigerant System.** There are two preferred methods used to charge the refrigerant system.

(1) Sight glass method.

(a) Evacuate the system as described in c above.

(b) Remove cap from suction tube charging valve.

(c) Connect hose from refrigeration charging hookup loosely to suction tube charging valve. Open refrigerant drum shutoff valve slightly to purge hose. Tighten connection at charging valve. Open shutoff valve and backseat charging valve.

(d) Refrigerant drum must be in upright position to allow only gaseous refrigerant to enter system.

(e) Start unit.

(f) To speed up charging, set refrigerant drum in warm water. Never use a heating torch for this purpose.

(g) Observe sight glass (fig. 4-10) at the time of charging, and even though the flash glass is apparent, shutoff refrigerant flow and observe sight glass for a period of 10 to 20 minutes. If at the end of this period, the sight glass is not free from flash glass, admit a small amount of charge and observe for the same time period. Repeat this operation until sight glass is clear.

(h) Frontseat charging valves and close refrigerant drum shutoff valve. Stop the unit and disconnect manifold hoses from charging valves, and install caps.

(2) **Weight method.** With this method, you are charging the unit with liquid.

(a) Evacuate the system as described above.

(b) Connect a bottle of refrigerant-22 to discharge high side access fitting, figure 4-7.

(c) Weight refrigerant bottle.

(d) Invert charging cylinder and open valve on refrigerant bottle and allow refrigerant to flow through system.

(e) Periodically weigh bottle until it is lighter by amount needed in system. This must be the exact amount.

CAUTION: Total amount of charge must be exactly 53 oz.

5-10. Wiring Harness and Wire Leads

a. **General.** The electrical circuits in the refrigeration unit are completed by individual wire leads or by leads laced or enclosed to form a wiring harness. When testing, repairing, or replacing the individual wires or harnesses, refer to wiring diagram figure 1-4.

b. **Inspection.** Inspect the wiring insulation for cracks and frayed material. Pay particular attention to the wires passing through holes in the frame or over rough edges. If inspection reveals a broken or cut wire, and the break in the wire is exposed, the wire must be repaired (d below). If the break in a wire is in a harness or inaccessible area, replace wire (e below).

c. **Testing.** Test a wire for continuity by disconnecting each end from the component to which it is connected. Touch the test-probes of a multimeter to each end of the wire. If continuity is not indicated, the wire is defective and must be repaired or replaced.

d. **Repair.** Remove the insulation on the wire to expose one-half inch of bare wire at both ends of the break. Twist bare wire together and solder the connection. Cover the repaired break with electrical tape and friction tape. Do not leave any bare wire exposed. If a terminal lug breaks off a wire, replace it, using an exact duplicate terminal lug.

e. **Replacement.** Replace a wire by disconnecting it from the component and remove the wire. Install a new wire and connect it to the component. If a broken wire is part of a wiring harness, disconnect the wire at each end and tape these ends with electrical tape. Install a new wire and attach it to the outside of the wiring harness.

5-11. Tubing and Fittings

The refrigerant piping used on the air condiioning units consists of copper tubing and necessary fittings. Joints of refrigeration pipes and fittings are soldered. Inspect the piping and fittings for cracks and breaks (para 4-38). Replace defective pipes with those of the same length, size, shape, and material. When soldering or unsoldering items such as the thermostatic expansion valves, or solenoid valves, disassemble valves and wrap valves bodies with a damp cloth to protec them from damage by heat.

Section IV. REMOVAL AND INSTALLATION

5-12. Compressor

The sole purpose of the compressor is to raise the pressure of refrigerant gas from evaporator pressure to condensing pressure. The function of the compressor is to deliver refrigerant to the condenser at a pressure and temperature at which the condensing process can readily be accomplished. The motor/compressor is a hermetically sealed unit and is not repairable in the field. An inoperative compressor is susually due to a mechanical failure causing the compressor to freeze, control failure, or a motor burnout. If the motor/compressor is mechanically frozen or there has been a motor burnout, the compressor must be removed and replaced. When the motor of a hermetic compressor fails, high temperatures may develop within the compressor causing a breakdown of the oil and refrigerant, resulting in formation of acid, moisture, and sludge. All these are extremely corrosive and must be flushed from the system. Repeated burnouts will occur if all of the contaminants are not removed.

5-13. Removal and Installation of Compressor

a. **Removal.**

(1) Remove front access panel (para 4-15) andpullout the junction and control boxes (para 4-22 and 4-26).

(2) Discharge refrigerant from system (para 5-9b).

(3) Remove condenser coil (para 5-4).

(4) Refer to figure 4-7 and remove compressor through rear of unit.

b. **Installation.**

(1) Refer to figure 4-7 and install compressor.

(2) Refer to paragraph 5-4 and install condenser coil.

(3) Evacuate and recharge the unit (para 5-9).

(4) Install junction and control boxes (para 4-22 and 4-26).

(5) Install front access panel (para 4-15).

CHAPTER 6. REPAIR OF AIR CONDITIONER

6-1. General

The compressor is hermetically sealed and cannot be repaired. In case of failure, the compressor must be replaced

6-2. Compressor

a. **Removal.** Refer to paragraph 5-13.

b. **Installation.** Refer to paragraph 5-13.

6-3. Evaporator Coil

a. Remove top panel and discharge grille (para 4-15).

b. Remove evaoporator coil.

c. **Repair.** Repair minor leaks or holes by soldering with silver solder (class 4 or 6A, QQ-S-561) per MIL-B-7883 If damage is excessive, replace evaporator coil.

d. **Installation.**

(1) Install evaporator coil.

(2) Install top panel and discharge grille (para 4-15).

(3) Leak test the entire system (para 4-38).

(4) Evacuate the system (para 5-9).

(5) Recharge the system (para 5-9).

6-4. Condenser Coil

a. **Removal.**

(1) Evacuate the system (para 5-9).

(2) Remove condenser coil grille (fig. 4-4).

(3) Remove three screws holding filter-drier brackets to shell.

(4) Pull condenser coil? figure 4-4, from unit and unsolder as required.

b. **Repair.** Repair minor leaks or holes by soldering with silver solder (class 4 or 6A, QQ-S-561) per MIL-B-7883 If damage is excessive, replace condenser coil.

c. **Installation.**

(1) Replace condenser coil (fig. 4-4).

(3) Evacuate and recharge the system (para 5-9).

(4) Replace three screws in filter-drier bracket.

(5) Replace condenser grille (fig. 4-4).

6-5. High Pressure Switch

a. **Removal.** Refer to figure 4-10 and remove high pressure switch.

b. **Installation.** Refer to figure 4-10 and install high pressure switch.

6-6. Low Pressure Switch

a. **Removal.** Refer to figure 4-10 and remove low pressure switch.

b. **Installation.** Refer to figure 4-10 and install low pressure switch.

6-7. Fan Speed Pressure Switch

a. **Removal.** Refer to figure 4-11 and remove fan speed presure switch.

b. **Installation.** Refer to figure 4-11 and install fan speed pressure switch.

6-8. *Liquid Line Solenoid Valve*

a. **Removal.** Slowly discharge refrigerant from system (para 5-9). Refer to figure 4-7 and remove the liquic solenoid valve.

b. **Installation.** Refer to figure 4-7 and install the liquid line solenoid. Evacuate and recharge refrigeration sy (para 5-9).

CAUTION: The Solenoid valves must be disassembled before disconnecting the tubing from the valve to avoid distortion. Refer to figure 6-1.

CAUTION: *Solder tubing to the body of the valve before reassembling the valve to avoid heat distortion.* Ref figure 6-1.

6-9. Equalizer Solenoid Valve

a. **Removal.** Slowly discharge refrigerant from the system (para 5-9).

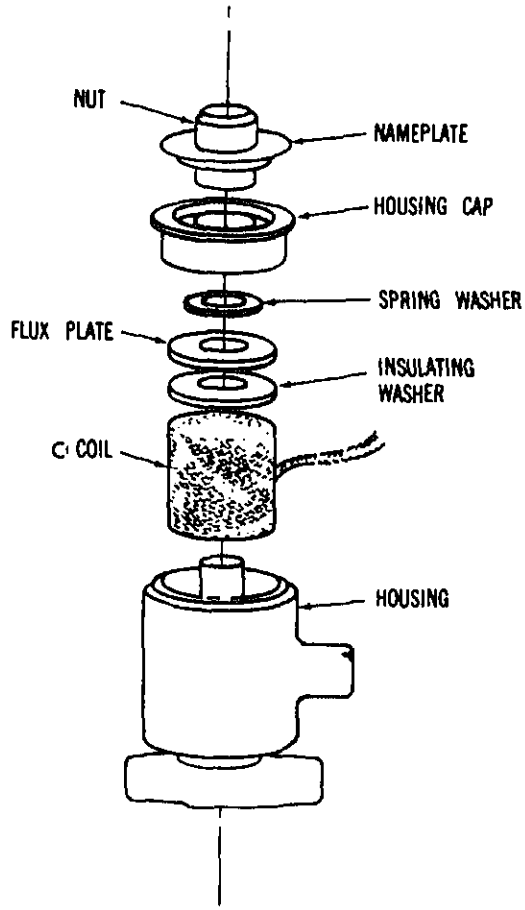
Refer to figure 4-8 and remove the equalizer solenoid valve.

b. **Installation.** Refer to figure 4-8 and install the equalizer solenoid valve. Evacuate and recharge the r eration system (para 5-9).

6-10. Expansion Valves

a. **Removal.**

(1) Remove cover panel (para 5-15).



TS5-4120-345-14/6-1

Figure 6-1. Solenoid valve, disassembly and reassembly.

(2) Turn stem clockwise for higher superheat and counterclockwise for lower superheat. One full turn equivalent to approximately 2 degrees F superheat. A suction gas superheat of 5 to 10 degrees F out of the evaporat coil is satisfactory. A superheat of 10 to 20 degrees F when measuring the superheat at the thermal bulb is also sat factory. If the superheat does not reach the required value when adjusted, check for dirt or other restrictions in t liquid line or expansion valve.

c. Installation.

(1) Refer to figure 4-8 and install the expansion valve.

(2) Charge unit (para 5-9).

(3) Replace cover panel (para 4-15).

6-11. Sight Glass

a. Removal. Slowly discharge the refrigerant charge from the system (para 5-9). Refer to figure 4-10 and remo sight glass.

b. Installation. Refer to figure 4-10 and install sight glass. Refer to paragraph 5-9 and recharge system.

6-12. Access Fittings

a. Removal.

(1) Remove front panel (para 4-15).

(2) Slowly discharge the refrigerant charge from the system (para 5-9).

(3) Unscrew valve stem from inside access valve.

b. Installation.

(1) Install valve stem into access valve.

(2) Recharge system (para 5-9).

(3) Install front panel (para 4-15).

6-13. Filter Drier

a. Removal. Slowly discharge the refrigerant charge from the system. (para 5-9). Refer to figure 4-7 and remo the filter drier.

b. Installation. Refer to figure 4-7 and install the filter drier. Charge the system with refrigerant (para 5-9).

APPENDIX A

REFERENCES

A - 1. Administration

TM 740-90-1	Administrative Storage, Forms and Records

A - 2. Fire Protection

TB 5-4200-200-10	Hand Portable Fire Extinguisher, Approved for Army Users.
TM 5-687	Repair and Utilities: Fire Protection Equipment and Appliances: Inspection, Operations, and Preventive Maintenance.

A - 3. Demolition — Demolition and Destruction of Equipment.

TM 750-244-2	Demolition and Destruction of Equipment.

A - 4. Painting

TM 9-213	Painting Instructions for Field Use.

A - 5. Preventive Maintenance

TM 5-764	Electric Motor and Generator Repair.
TM 5-4120-345-ESC	Air Conditioner, Vertical, Compact, 9,000 BTU, 115V, Equipment Servicability Criteria.
TM 5-4120-345-24P	Repair Parts and Special Tools List.
TM 38-250	Crate Fabrication.
TM 38-750	Army Equipment Records Procedures.

A - 6. Supply Publications

C9100-IL	Fuels, Lubricants, Oils, and Waxes.

APPENDIX B

MAINTENANCE ALLOCATION CHART

Section I. Introduction

B-1. General.

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. The Maintenance Allocation Chart (MAC) in Section II designates overall responsibility for the performance of maintenance functions on the identified end item or component. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

c. Section III lists the special tools and test equipment required for each maintenance function as referenced from Section II.

d. Section IV contains supplemental instructions on explanatory notes for a particular maintenance function.

B-2. *Maintenance Functions.*

a. **Inspect.** To determine the serviceability of an item by comparing its physical, mechanical and/or electrical characteristics with established standards through examination.

b. **Test.** To verify serviceability and detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. **Service.** Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

d. **Adjust.** To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. **Align.** To adjust specified variable elements of an item to bring about optimum or desired performance.

f. **Calibrate.** To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. **Install.** The act of emplacing, seating, or fixing into position an item, part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. **Replace.** The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

i. **Repair.** The application of maintenance services (inspect, test, service, adjust, align, calibrate, or replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), and item, or system.

j. **Overhaul.** That maintenance effort (services/actions) necessary to restore an item to a completely serviceable/ operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. *Overhaul does not normally return an item to like new condition.*

k. **Rebuild.** *Consists of those services/actions necessary for the restoration of unserviceable equipment to a like* new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipments/components.

B-3. Column Entries Used in the MAC:

a. **Column 1, Group Number.** *Column 1 lists group numbers, the purpose of which is to identify components,* assemblies, subassemblies, and modules with the next higher assembly.

b. **Column 2, Component/Assembly.** Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. **Column 3, Maintenance Functions.** Column 3 lists the functions to be performed on the item listed in column 2. (For detailed explanation of these functions, see paragraph B-2.)

d. **Column 4, Maintenance Level.** Column 4 *specifies, by the listing of a work time figure in the appropriate sub*column(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure repre*sents the active time required to perform the maintenance function at the indicated level of maintenance.* If the number or complexity of the tasks within the listed maintenance function vary at different maintenance levels, appropriate work time figures will be shown for each level. The number of man-hours specified by the work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various maintenance levels are as follows:

C . . . . . .Operator or crew
O . . . . . .Organization maintenance
F . . . . . .Direct support maintenance
H . . . . . .General support maintenance
D . . . . . .Depot maintenance

e. **Column 5, Tools and Equipment.** Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, test, and support equipment required to perform the designated function.

f. **Column 6, Remarks.** This column shall contain a letter code in alphabetical order which shall be keyed to the remarks contained in Section IV.

B-4. Column Entries Used in Tool and Test Equipment Requirements.

a. **Column 1, Tool or Test Equipment Reference Code.** The tool and test equipment reference code correlates with a maintenance function on the identified end item or component.

b. **Column 2, Maintenance Level.** The lowest level of maintenance authorized to use the tool or test equipment.

c. **Column 3, Nomenclature.** Name or identification of the tool or test equipment.

d. **Column 4, National/NATO Stock Number.** The National or NATO stock number of the tool or test equipment.

e. **Column 5, Tool Number.** The manufacturer's part number.

5. Explanation of Columns in Section IV.

a. **Reference Code.** The code scheme recorded in column 6, Section II.

Section II. Maintenance Allocation Chart for Air Conditioner, 9M Compact Vertical

(1)	(2)	(3)	(4)	(5)
GROUP NUMBER	COMPONENT/ASSEMBLY	MAINTENANCE FUNCTION	MAINTENANCE CATEGORY* C O F H D	TOOLS EQUIP
01	Body Chasis			
0101	Panels, Grille, and Screen	Replace	0.1	
		Repair	0.2	
0102	Sound Attenuator	Replace	0.2	
0103	Cover, Condenser	Replace	0.3	
02	Fan			
0201	Fan, Centrifugal	Clean	0.2	
		Replace	0.3	
0202	Fan, Axial	Clean	0.2	
		Replace	0.3	
03	Electric Motor			
0301	Motor	Test	0.5	
		Replace	1.3	
		Repair	2.0	
04	Heating System			
0401	Heating Element	Test	0.2	
		Replace	0.5	
		Repair	0.3	
0402	Thermostat Heater	Test	0.2	
		Replace	0.4	
05	Electrical Controls			
0501	Control Module	Test	1.0	
		Replace	0.5	
		Repair	0.5	
0502	Thermostat	Test	0.4	
		Replace	1.0	
0503	Switch Toggle or Rotary	Test	0.3	
		Replace	0.6	
0504	Blockoff Plate	Replace	0.1	
06	Starting & Protective Device			
0601	Capacitor	Test	0.2	
		Replace	0.2	
0602	Relays	Test	0.3	
		Replace	0.3	
0603	Fuses	Test	0.2	
		Replace	0.2	
0604	Transformer	Test	0.3	
		Replace	0.3	
0605	Circuit Breakers	Test	0.4	
		Replace	0.4	
0606	Rectifier	Test	0.3	
		Replace	0.3	
07	Wiring			
0701	Wiring Harness			

Section II. Maintenance Allocation Chart for Air Conditioner, 9M Compact Vertical (Cont.)

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY* C	O	F	H	D	(5) TOOLS AND EQUIPMENT
08	Compressor	Test	0.3					
		Service	1.0					
		Replace			6.0			
		Repair			6.0			
0802	Evaporator Coil	Clean	0.5					
		Test	.0.5					
		Replace			6.0			
0803	Condenser Coil	Clean	0.5					
		Test			6.0			
		Repair			6.0			
0804	Dehydrator	Test	0.4					
		Replace			6.0			
0805	Solenoid Valve	Test	0.2					
		Replace			6.0			
0806	Sight Glass	Test	0.4					
		Replace			6.0			
0807	Refrigerant Piping	Test	0.5					
		Replace			6.0			
		Repair			6.0			
0808	Expansion Valve	Inspect	0.5					
		Replace			6.0			
0809	Pressure Switches	Replace			6.0			
0810	Actuator	Inspect	0.4					
		Replace			6.0			
0811	Vibrator Eliminator	Test	0.5					
		Replace			6.0			
09	Drain							
0901	Drain Tube	Inspect	0.2					
		Replace	0.4					
10	Filter							
1001	Air Filter	Inspect	0.2					
		Clean	1.0					
		Replace	0.2					

INDEX

INDEX

By Order of the Secretary of the Army:

BERNARD W. ROGERS
General, United States Army
Chief of Staff

Official:

J. C. PENNINGTON
Major General, United States Army
The Adjutant General

DISTRIBUTION:

To be distributed in accordance with DA Form 12-25C, Operator Maintenance requirements for Environmental Equipment, Air Conditioners: 9000 BTU.

☆U.S. GOVERNMENT PRINTING OFFICE : 1989 O - 242-451/05742

THEN. . .JOT DOWN THE DOPE ABOUT IT ON THIS FORM, TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

FROM: (YOUR UNIT'S COMPLETE ADDRESS)
PFC JOHN DOE
COA, 3d ENGINEER BN
FT. LEONARD WOOD MO 63108

DATE

PUBLICATION NUMBER	DATE	TITLE
TM 5-4120-345-14	30 July 1979	Air Conditioner, Vertical Compact 9,000 BTU, 115 Volt

BE EXACT. . .PIN-POINT WHERE IT IS

PAGE NO.	PARAGRAPH	FIGURE NO.	TABLE NO.	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
6	2-1 a			In line 6 of paragraph 2-1a the manual states the engine has 6 cylinders. The engine on my set only has 4 cylinders. Change the manual to show 4 cylinders
81		4-3		Callout 16 on figure 4-3 is pointing at a bolt. In the key to fig. 4-3, item 16 is called a shim. Please correct one or the other.
125	line 20			I ordered a gasket, item 19 on figure B-16 by NSN 2910-00-762-3001. I got a gasket but it doesn't fit. Supply says I got what I ordered so the NSN is wrong. Please give me a good NSN.

SAMPLE

TYPED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER
JOHN DOE, PFC (268) 317-7111

SIGN HERE:
John Doe

DA FORM 1 AUG 74 2028-2 (TEST)

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR MANUAL "FIND," MA... A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

FILL IN YOUR UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

POSTAGE AND FE
DEPARTMENT OF T
000-314

OFFICIAL BUSINESS

PENALTY FOR PRIVATE USE, $300

Commander
US Army Troop Support and Aviation
Materiel Readiness Command
ATTN: DRSTS-MTPS
4300 Goodfellow Boulevard
St. Louis, MO 63120

FOLD BACK

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL MANUALS

SOMETHING WRONG WITH THIS MANUA

THEN. . .JOT DOWN THE DOPE ABOUT IT ON THIS FORM, TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

FROM: (YOUR UNIT'S COMPLETE ADDRESS)

DATE

PUBLICATION NUMBER	DATE	TITLE
TM 5-4120-345-14	30 July 1979	Air Conditioner, Vertical Co 9,000 BTU, 115 Volt

BE EXACT. . .PIN-POINT WHERE IT IS

PAGE NO.	PARAGRAPH	FIGURE NO.	TABLE NO.

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

TEAR ALONG DOTTED LINE

FILL IN YOUR UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS

PENALTY FOR PRIVATE USE, $300

POSTAGE AND FEES P
DEPARTMENT OF THE A
DOD-314

Commander
US Army Troop Support and Aviation
Materiel Readiness Command
ATTN: DRSTS-MTPS
4300 Goodfellow Boulevard
St. Louis, MO 63120

FOLD BACK

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL MANUALS

SOMETHING WRONG WITH THIS MANUAL?

THEN. . .JOT DOWN THE DOPE ABOUT IT ON THIS FORM, TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

FROM: (YOUR UNIT'S COMPLETE ADDRESS)

DATE

PUBLICATION NUMBER	DATE	TITLE
TM 5-4120-345-14	30 July 1979	Air Conditioner, Vertical Compact 9,000 BTU, 115 Volt

BE EXACT. . .PIN-POINT WHERE IT IS

PAGE NO.	PARAGRAPH	FIGURE NO.	TABLE NO.

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

FILL IN YOUR UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

POSTAGE AND FEES
DEPARTMENT OF THE
DOD-314

OFFICIAL BUSINESS

PENALTY FOR PRIVATE USE, $300

Commander
US Army Troop Support and Aviation
Materiel Readiness Command
ATTN: DRSTS-MTPS
4300 Goodfellow Boulevard
St. Louis, MO 63120

FOLD BACK

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL MANUALS

SOMETHING WRONG WITH THIS MANUAL?

THEN. . .JOT DOWN THE DOPE ABOUT IT ON THIS FORM, TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

FROM: (YOUR UNIT'S COMPLETE ADDRESS)

DATE

PUBLICATION NUMBER	DATE	TITLE
TM 5-4120-345-14	30 July 1979	Air Conditioner, Vertical Comp 9,000 BTU, 115 Volt

BE EXACT. . .PIN-POINT WHERE IT IS

PAGE NO.	PARAGRAPH	FIGURE NO.	TABLE NO.

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

TEAR ALONG DOTTED LINE

FILL IN YOUR UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

POSTAGE AND FEES PAID
DEPARTMENT OF THE ARMY
DOD-314

OFFICIAL BUSINESS

PENALTY FOR PRIVATE USE, $300

Commander
US Army Troop Support and Aviation
Materiel Readiness Command
ATTN: DRSTS-MTPS
4300 Goodfellow Boulevard
St. Louis, MO 63120

FOLD BACK

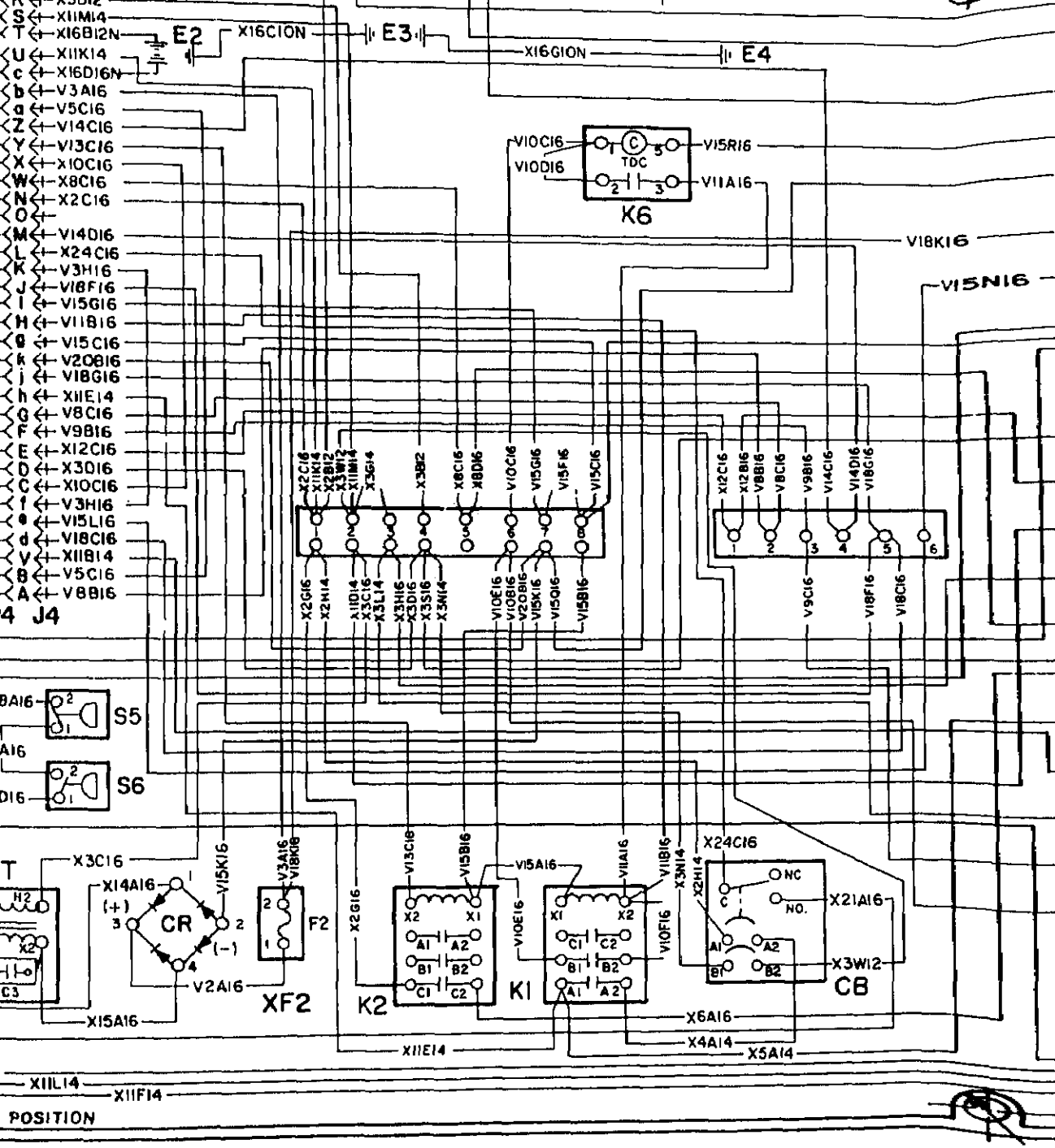


Figure 1-4. Wir

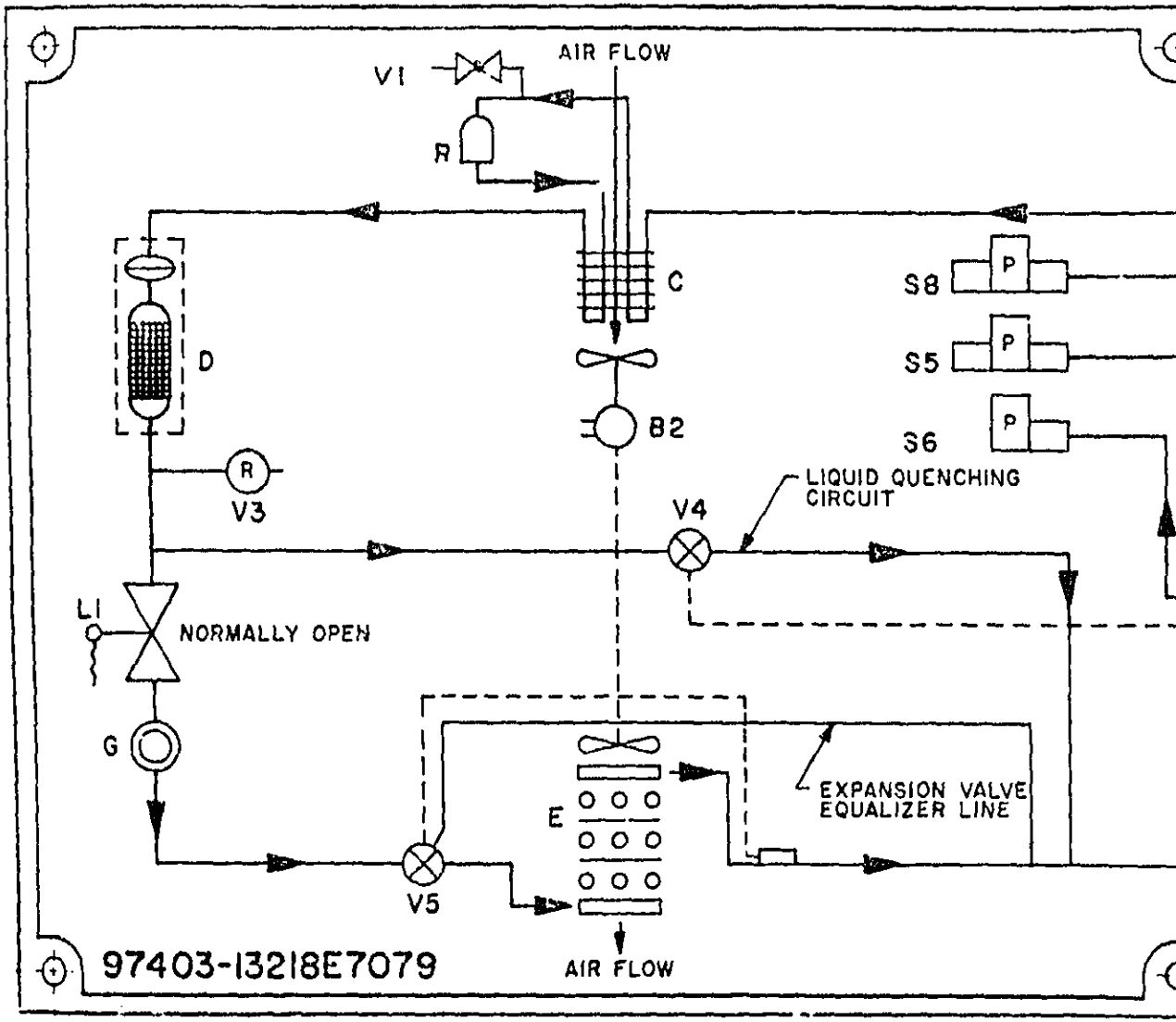


Figure 5-1. Refrigerant

1 centimeter = 10 millimeters = . 39 inch
1 decimenter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = . 15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigrams = . 035 ounce
1 dekagram = 10 grams = . 35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

1 centiliter = 10 milliliters = . 34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 38.82 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = . 155 sq.
1 sq. decimenter = 100 sq. centimeters = 15.5 sq.
1 sq. meter (centare) = 100 sq. decimeters = 10.76
1 sq. dekameter (are) = 100 sq. meters = 1,076.4
1 sq. hectometer (hectare) = 100 sq. dekameters =
1 sq. kilometer = 100 sq. hectometers = . 386 sq. m

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = . 06 cu.
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu
1 cu meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*
inches	centimeters	2.540	ounce-inches	newton-meters
feet	meters	.305	centimeters	inches
yards	meters	.914	meters	feet
miles	kilometers	1.609	meters	yards
square inches	square centimeters	6.451	kilometers	miles
square feet	square meters	.093	square centimeters	square inches
square yards	square meters	.836	square meters	square feet
square miles	square kilometers	2.590	square meters	square yards
acres	square hectometers	.405	square kilometers	square miles
cubic feet	cubic meters	.028	square hectometers	acres
cubic yards	cubic meters	.765	cubic meters	cubic feet
fluid ounces	milliliters	29,573	cubic meters	cubic yards
pints	liters	.473	milliliters	fluid ounces
quarts	liters	.946	liters	pints
gallons	liters	3.785	liters	quarts
ounces	grams	28.349	liters	gallons
pounds	kilograms	.454	grams	ounces
short tons	metric tons	.907	kilograms	pounds
pound-feet	newton-meters	1.365	metric tons	short tons
pound-inches	newton-meters	.11375		

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after	Celsius	°C